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Section A

PRIVACY AND PERSONAL INFORMATION PROTECTION IN KOSOVO: CHALLENGES AND PERSPECTIVES

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Abstract

As a fundamental human right, privacy, and data protection are becoming increasingly important in the digital age. This study examines the challenges and opportunities for privacy and data protection in Kosovo, with a particular focus on the legal system, the impact of technology, and public awareness. A qualitative research approach was used, reviewing reports from relevant organizations, international treaties, and legal documents. While the findings show significant progress in aligning Kosovo's legal system with European standards, they also reveal gaps in implementation and knowledge. Rapid technological advances have outpaced legislative measures and exposed vulnerabilities in data security. The study comes to the conclusion that in order to address these issues, it is imperative to enhance the National Agency for Personal Data Protection, improve enforcement mechanisms, and advance public education. Establishing robust protections for personal data in Kosovo's changing digital environment requires cooperation between the public and commercial sectors.

Keywords: Privacy, personal data protection, Kosovo, human rights, technology, legal framework, data security.

INTRODUCTION

The right to the protection of personal data and privacy is a fundamental right within human rights. This right is essential for the functioning of a democratic society. The rapid development of information technology and telecommunications has complicated the personal data protection process. Now, modern technology devices, such as smartphones, computers, laptops, etc., have become the main tools for collecting and storing personal data. This

development of technology, on the one hand, made our lives easier, but on the other hand, it negatively affected our privacy.

The right to respect family life protects both the actual family life as well as the potential family life of an individual. But the right to privacy does not always allow all, sometimes it can even be confiscated if it is a question of abuses, terrorism, etc. The right to privacy is one of the main rights that is related to many other rights and that can be considered as a basis for the enjoyment of other rights.

The right to privacy implies the individual's right to live peacefully in his family and home independently from others, and the law guarantees him protection from unauthorized interference by other individuals. (Frank, 1972)

In contrast to this definition, the other author Robert B. Hallberg gives another definition where according to him the right to privacy or the right not to be seen or heard is subject to an essential limitation. So it does not waive the right not to be seen or heard when one goes public. The right to privacy is and must be subject to a substantial limitation.(Hallborg Jr, 1986)

The process of protecting personal data is a standard considered very important both at the local and international levels, the implementation of which is becoming part of the daily agenda for most democratic countries. The need for the protection of personal data has come as a result of the accelerated development of information technology. Taking as a comparison the traditional forms of collection and storage of personal data which were almost entirely archived in an analog way, the new technology has almost completely transformed the concept of collection and storage of these data. Modern technology devices such as computers, internet networks, audio and video recordings, etc., have become the main tools for collecting and storing personal data.

Favoring this development in the field of information technology was the continuous decrease in the market price of these devices as a result of the increase in market offers, making their possession possible for almost every individual. This easy access to the possession of these devices has increased the number of actors involved in the process of collecting, storing, or using personal data in both the public and private sectors. (Gottwald, 1996) In fact, nowadays with new technology, it has become very easy and extremely cheap that any natural or legal person can have access to personal data by creating databases to collect important personal data. In this context, given the constant increase in dynamics at work and therefore the acceleration of the exchange of information, it has become almost impossible to avoid the exposure of personal data. Exposure of personal data starts from the civil registration offices (birth registration, issuing of identity cards, passports, and birth certificates), business registration offices, filling out forms for various applications, submitting CVs, opening bank accounts or e-mail addresses, purchasing of telephone numbers, registration in various social networks, E-marketing, registration during entrances to buildings, during registration of participation in conferences, during border control, during police identification, surveillance with cameras and many others. Taking into account the variety of situations in which almost every citizen is obliged to expose personal data, it can be said that in addition to the positive aspects that the facilitation of communication has brought, especially in the efficiency of the use of time and the reduction of expenses, these developments have also negative impacts in the field of personal data protection. (Gierke, 2010) The negative part of this development has to do especially with the exposure of important private data, the disclosure of which may harm the personal interests of those individuals or companies.

Bearing in mind that technological development in the field of information technology is a global concept that has not spared anyone, it can be said that Kosovo and its citizens have been and remain followers of these developments. Thus, even though our country still has many challenges to overcome in the journey of building the state and improving economic well-being, this does not mean at the same time that we dare to ignore the protection of those rights that can even be considered for each individual and that are related to the protection of personal data and privacy in general. In the end, because Kosovo has already adopted the relevant law that regulates this field, it is necessary that through analysis and research, the aim is to make the general public aware of the level of implementation of the protection of personal data, as well as the importance that this field presents. More concretely, from the contemporary perspective, the protection of personal data is as important as all other basic human rights. (Vrajolli & Kryeziu, 2011)

LITERATURE REVIEW

The concept of privacy is deeply embedded in human relationships and is recognized as a fundamental right, both internationally and domestically. The protection of personal information has become increasingly challenging with the rapid evolution of information technology, particularly in countries like Kosovo. The importance of safeguarding personal data is underscored by the role it plays in upholding human rights and freedoms.

The digital age, marked by the prevalence of devices like smartphones and computers, has revolutionized the collection and storage of personal data. While technological advancements have undoubtedly improved efficiency, they have also raised concerns about privacy infringement. The right to privacy encompasses the individual's ability to live peacefully in their family and home, protected from unauthorized interference. However, with the proliferation of technology, exposure of personal data has become nearly unavoidable, posing risks to individuals' interests.

The protection of personal data is crucial, given the diverse situations in which individuals are obligated to disclose sensitive information. This includes civil registration processes, business transactions, social media activities, and more. The ease of access to technology has led to an exponential increase in the number of entities, both public and private, involved in collecting, storing, and using personal data. This development has both positive and negative implications, with the negative aspects primarily concerning the exposure of private data that may harm individuals or companies.

Kosovo, despite facing challenges in state-building and economic development, has recognized the importance of protecting personal data. The adoption of relevant legislation indicates a commitment to ensuring that the rights associated with personal data and privacy are not overlooked. However, public awareness remains a challenge, particularly in rural areas, where citizens may not be fully informed about their rights.

RESEARCH METHODOLOGY

This research employs a qualitative approach, focusing on an analysis of the challenges and perspectives surrounding privacy and personal information protection in Kosovo. The study examines the current legal framework, technological advancements, and societal implications. Data collection involves a comprehensive review of existing literature, including legal documents, international agreements, and scholarly articles.

RESEARCH OBJECTIVES

1. Evaluate the current legal framework for personal data protection in Kosovo.
2. Assess the impact of technological advancements on the privacy of individuals in Kosovo.
3. Examine societal perspectives and awareness regarding personal data protection.
4. Identify challenges faced by both public and private sectors in implementing and complying with data protection regulations.
5. Investigate the role of the State Agency for Personal Data Protection in monitoring and enforcing data protection laws.

PROTECTION OF PERSONAL DATA AND BREACH OF PRIVACY

The bodies of the state power, in most cases, are presented in the capacity of the body in which the data are collected, recorded, processed, and use most of the citizens' data. This happens especially with the state administration bodies, which, while observing the situations in the territories for which they were created, keep various records and registers that are partially or completely related to citizens' data (e.g., mother records of born, married, deceased, and evidence for taxpayers, etc.). However, other state bodies, courts, and other legal entities authorized by law keep records and collections of various data that include the personal data of citizens (Central Registry, records in the field of work, health, defense social, personal evidence, etc.). Based on this, the protection of the personal data of citizens, as constitutionally guaranteed, but also by other international acts, appears as an important issue concerning the daily activity of a large number of public sector bodies. (Zeiller, 1998)

The legal protection of personal data also extends to cases where, in addition to state bodies and other legal, natural, or individual persons in the exercise of their profession or independent activity, they are presented as users with a summary of data based on legal authorization or written consent. of the person to whom the data relate. The purpose of personal data protection is to ensure the privacy and confidentiality of data relating to natural persons, while they are the object of collection, processing, storage, use, and exchange of data in the form of manual summaries of data. (Treschsel, 1980)

Summary of data is multiple organized data that fully or partially contain personal data (registers, records, databases, and the like) that are recorded and used manually or with tools for automatic data processing. The protection of personal data is carried out through legal treatment and measures. The summary of data is established, maintained, and used by data users who may be legal and natural persons or individuals in the independent exercise of the activity or profession authorized by law or based on written consent from the person for whom they have to do the data. (Matscher, Petzold, & Wiarda, , 1988)

Users with data can transfer certain actions related to the collection, processing, storage, use, and delivery of data to the contracted executor – a legal entity or individual in the independent exercise of activity or profession or natural person authorized to the exercise of this activity. The holder of personal data can collect, process, store, use and submit them only for purposes specified by law or for purposes resulting from the written consent of the person to whom the data relate, and never use them contrary to legal purposes. The data provider can submit personal data only to the user who is authorized by law for their use, or based on a written request or written consent of the person or his authorized representative. The user of the data can use the obtained data only in a way that is by the law. Personal data that the user uses for scientific research, education, or for other similar purposes, the holder of the summary of the data is obliged to submit them in a manner and form that do not enable the identification of the person. (Henkel, 1958)

With the organized technological actions and measures that are undertaken due to the protection of personal data, the spaces, equipment, and programs through which personal data are processed are secured, the delivery and transfer of personal data are guaranteed and unauthorized access to equipment and devices is prevented. programs using which personal data are processed and summaries containing personal data. (Government, 2022)

CRIMINAL DEFENSE

Privacy, as we understand it today, has its origins some 150 years ago. The origins of the right to privacy can be traced back to the nineteenth century. In 1890, Samuel D. Warren and Louis D. Brandeis published "The Right to Privacy," an influential article that assumed a general common law right to privacy. Before the publication of this article, no US court had recognized this legal right. Since the article was published, courts have relied on it in hundreds of cases presenting a variety of privacy issues. (Solove, 2006)

Unlawful invasion of privacy is a criminal offense. Anyone who uses personal data, transferring it illegally is punished. Even revealing official secrets is punishable. Not all acts are prohibited in terms of privacy because where the general interest of the state depends, it is not considered illegal.

CIVIL DEFENSE

Illegal violation of private life means when a person's rights in personal and family life have been violated, that is, a violation of the most intimate rights, and thus for that person the right to seek compensation arises. In modern legal systems, a person does not need to be injured in his honor or authority to seek civil protection, but the violation of privacy provided by law is sufficient. Such protection, the person can seek through the courts. The person whose privacy rights have been violated is available to request the termination of this violation and the request for compensation for moral damage, etc. (Prof. dr. sc. Nikola Gavella- Osobna Prava I.dio, 2000)

PROTECTION OF PERSONAL DATA IN KOSOVO

The protection of personal data in Kosovo is a fundamental right guaranteed by the Constitution of the Republic of Kosovo. The right to protection of personal data and privacy, as part of human rights and freedoms, based on Article 22, is guaranteed by the Constitution.

Human rights and freedoms guaranteed by international agreements and instruments apply directly in the Republic of Kosovo and have priority, in case of conflict, over the provisions of laws and other acts of public institutions. And, based on Article 53 of the Constitution of the Republic of Kosovo, the human rights and fundamental freedoms guaranteed by this Constitution are interpreted in harmony with the judicial decisions of the European Court of Human Rights.

Article 36 of the Constitution specifies that privacy and family life, inviolability of residence, the secrecy of correspondence, communication by telephone and other means, and protection of personal data are guaranteed for each individual. Thus, the Constitution and the Law guarantee the implementation of some of the main international and European conventions regarding data protection. These conventions are the Universal Declaration of Human Rights; European Convention for the Protection of Human Rights; Fundamental freedoms and protocols; Convention 108/EC and additional protocol (Europe, 2008); EU directives 95/46/EC (Protection, 2022) and directive 2006/24/EC (Për mbajtjen e të dhënave të gjeneruara ose përpunuara në lidhje me dispozitën e shërbimeve të komunikimit publik elektronik ose të rrjeteve të komunikimit publik dhe ndryshimit). Since Kosovo is not yet a member of the relevant international organizations and as a consequence is not a signatory party, then these conventions are applied unilaterally.

The Law on the Protection of Personal Data (Law No. 2010/03-L-172), regarding the protection of personal data, was adopted in April 2010, and as such was generally in harmony with the European Directive on the protection of personal data (Directive 95/46/EC). While great efforts are being made by the European Union to modify the existing directive to future circumstances, the existing law in Kosovo is advanced and the possible modifications of the EU directive do not require any major changes to the law of Kosovo. However, it was a request of the EU communication in the "Feasibility Study for the Stabilization Association Agreement between the European Union and Kosovo that the legislation for the protection of personal data should be further harmonized with EU standards."

The law on the protection of personal data defines the rights, responsibilities, principles, and measures regarding the protection of personal data. The law also defines the institution responsible for monitoring the legitimacy of data processing. The law stipulates the establishment of the State Agency for Personal Data Protection (ASHMDHP), which is defined as an independent body under the direct supervision of the Assembly of Kosovo, which is responsible for supervising the implementation of data protection legislation. Therefore, the law specifies that the Agency will: provide advice to public and private bodies on issues related to data protection; decide on data-related complaints; made inspections and audits; inform the public about issues and developments in the field of data protection, and; promote and support fundamental data protection rights. (Qehaja)

PROTECTION OF PERSONAL DATA PROVIDED BY THE CRIMINAL CODE OF THE REPUBLIC OF KOSOVO

The protection of privacy is also regulated by the Criminal Code of the Republic of Kosovo, respectively in article 199, paragraphs 1 and 2 of this Code, regulates the violation of the confidentiality of correspondence and computer databases, where further this article provides: "Anyone who without authorization opens a letter, telegram, facsimile or any other closed document or delivery or electronic communication of another person, or in any other way violates the confidentiality of such materials or without authorization retains, conceals, destroys

or delivers another person's letter, telegram, facsimile, electronic communication or any other closed document or delivery of the other person, shall be punished by a fine and imprisonment of up to six months. Anyone who without authorization intervenes in the computer database of another person or uses those data or makes them available to another person shall be punished by a fine and imprisonment for up to one year." (Official Gazette , 2019) So, as you can see in this provision of the Criminal Code, a prison sentence is provided if the confidentiality of data is violated and that the violation of this right constitutes a criminal offense.

In article 200, paragraph 1 of the Criminal Code, it is provided that "if the lawyer, defender, doctor or another person who without authorization discloses confidential information about which he was made aware during the exercise of his profession and which he is legally obliged to keep in secret, shall be punished by a fine or by imprisonment for up to one year". (Official Gazette , 2019) Article 201 paragraph 1 of this Code also states: "Anyone who, without authorization, eavesdrops on a conversation or statement or enables another person to be aware of the conversation or statement that was intercepted without authorization, is punished with imprisonment of one to three years(Official Gazette , 2019), while article 202 paragraph 1 provides: Anyone who without authorization photographs, films, videotapes or in any other way records another person in his residence or in any other place where the person has a reasonable expectation of privacy and in this way fundamentally infringes another's privacy, shall be punished with a fine or imprisonment of one to three years". (Official Gazette, 2019)

What is special in this aspect is that the protection of personal data has earned the epithet of their protection with the Criminal Code and the pursuit of potential violators of these rights is carried out according to the official duty, (Official Gazette , 2019) relate to data protection; decide on data related complaints; made inspections and audits; inform the public about issues and developments in the field of data protection, and; promote and support fundamental data protection rights. (Qehaja)

The installation of cameras in toilets can raise serious privacy concerns. Bathrooms and toilets are considered private spaces where people expect to have complete privacy. Cameras in these spaces can be a violation of privacy and can make people feel uncomfortable and insecure.

ACCESS TO DATA STORED BY THE STATE

It is often more the individual's inability to access information held by the State on the subject of the complaint than the fact that such data is held by the State's archives. In the case of Gaskin v United Kingdom, the applicant, who had been taken into care at a very young age and remained there until he reached adulthood, wanted access to the entire file relating to his time in the care of the State. In contrast to the Leander case, the applicant in the Gaskin case did not complain that information about him had been collected and stored. He challenged the failure to give him access to that information as a failure to respect his privacy under Article 8, the Court had no difficulty in deciding that the information contained in the file belonged to the private and family life of the applicant, whose lack of access drew the attention of Article 8. It then went on to consider whether a fair balance had been struck between the general interest of the community – in keeping the system of social services records confidential – and the interests of the individual – in accessing information relating to his private life. Concerning the latter, the Court observed that persons like the applicant have a "vital interest" in obtaining information that is necessary to know and understand their childhood and early development. About the general

interest, however, the Court noted the important link that exists between obtaining objective and reliable information and maintaining a confidential system of public records.

As a result, it held that a system that accesses records that are dependent on the consent of the contributor complies, at least in principle, with Article 8. However, difficulties arise in securing the interests of the individual seeking access to archives related to his private and family life, when the contributor of the information is either not available, or unreasonably refuses to give his consent. According to the Court, such a system will be compatible with the principle of proportionality only if it ensures that an independent authority decides definitively whether access should be granted in cases where the contributor does not respond or does not give his consent. (Gaskin v. Great Britain,, 1989)

CONCLUSION

The right to privacy for all persons must be guaranteed. Article 36 of the Constitution of the Republic of Kosovo protects the privacy and guarantees the protection of personal data. The right to private life, affirmed in the Constitution, includes the guarantee given to the individual not to incriminate himself, the right of the individual to make his data public when he wants, as well as the protection of this data, to the right to protect the privacy of the apartment from involuntary and unauthorized police interventions, as well as the privacy of correspondence.

Undoubtedly, the Strasbourg Court played and plays an irreplaceable role in the understanding and protection of this right, according to which, the right to respect for private and family life has, first of all, the purpose of protecting the individual from arbitrary interference by public authorities. This goal is achieved by protecting the four dimensions of personal autonomy of an individual which are private life, family life, housing, and correspondence. Privacy is precisely the right to maintain control over the information that belongs to us, to be aware that many of our daily actions leave traces in such a way that they reveal the details of our Personality, our inner belief, that we do not always want others know him. In the past, it was expensive to get someone under surveillance, but shortly, it will be expensive to get someone out of surveillance. Based on this, the majority of citizens in Kosovo continue to be uninformed about the existence of the Law on Personal Data Protection and the importance of the implementation of this law.

The exposure of citizens to the violation of privacy in Kosovo remains particularly high. Until now, there have been no criteria for verifying the cases of collection of personal data in an unauthorized manner, as well as there has been no adequate control for how the collected data is processed in cases where such authorization exists. In this regard, there is a lack of awareness regarding this field, both on the part of actors in the public or private sector who collect personal data in an authorized manner, as well as by ordinary citizens. Kosovo has made progress in terms of data protection personal and the right to privacy in the period from 2011-2013. Progress can be measured against the complete lack of public awareness of their rights before the adoption of the legislation (in 2010), and in particular before the establishment of the State Agency for the Protection of Personal Data (ASHMDHP).

Public awareness remains one of the challenges in the field of data protection. The agency has not managed to sensitize citizens in all regions, and in particular, these challenges remain more pronounced against the awareness of citizens in rural areas. The media was used as a means of raising awareness, but not at such a satisfactory level, knowing that the media have an extraordinary role in preserving and respecting private-family life.

Recommendations

To effectively address the challenges and improve the protection of privacy and personal information in Kosovo, several key actions should be prioritized:

1. **Enhance Public Awareness**: It is crucial to implement widespread and targeted awareness campaigns, particularly focusing on educating citizens in rural and underserved areas. These campaigns should aim to inform individuals about their rights concerning personal data and emphasize the importance of data protection in everyday life. Awareness efforts should also include practical guidance on how citizens can safeguard their personal information in an increasingly digital world.
2. **Strengthen Legal Frameworks:** Kosovo's legal framework for data protection should be continuously reviewed and updated to keep pace with the rapid evolution of technology and international data protection standards. Legislators must ensure that the legal provisions offer robust protection for personal data, including clear guidelines for data collection, processing, and storage. Additionally, the law should impose stringent penalties for violations, ensuring deterrence and accountability among both public and private entities.
3. **Promote Collaboration and Coordination**: A coordinated approach involving government institutions, private sector organizations, and civil society is essential to effectively protect personal data. This collaboration should focus on sharing knowledge, resources, and best practices for data protection. By fostering open communication and cooperation among these stakeholders, Kosovo can create a more unified and effective system for safeguarding personal information.
4. **Conduct Regular Audits and Assessments**: To ensure compliance with data protection regulations, regular audits should be carried out, especially within the public sector, where large amounts of sensitive personal data are often processed. Continuous monitoring mechanisms must be established to detect potential breaches or non-compliance. These audits should be accompanied by assessments that identify areas for improvement and recommend corrective actions to enhance data security practices.
5. **Foster International Cooperation**: Given the global nature of data flows and digital technologies, Kosovo should strengthen its collaboration with international organizations and neighboring countries. By sharing best practices and aligning regional data protection efforts, Kosovo can bolster its capacity to address cross-border data protection challenges and stay informed about emerging global trends in privacy laws and regulations.

Addressing the privacy and personal information protection challenges in Kosovo requires a comprehensive, multi-stakeholder approach. By focusing on public awareness, legal reforms, inter-institutional cooperation, continuous assessments, and international collaboration, Kosovo can establish a robust data protection framework that ensures the privacy rights of individuals are respected in the digital age.

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Section A

ANALYSIS OF SOCIAL MEDIA PUBLIC RELATIONS MANAGEMENT IN MACEDONIAN AND TURKISH FOOTBALL CLUBS IN SEASON 22/23

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Abstract

Public relations essentially represent one of the most effective ways to communicate and promote sports clubs. Two-way communication is a key element of well-organized and orderly public relations. With the emergence of social networks, due to the opportunities they offer, public relations represent an important link in the successful management of every sports club. The main goal of the research is to present the current state of public relations management on social networks among football clubs from the First Macedonian League and football clubs from the First Turkish Super League, as well as to make a comparison between the two leagues. In order for the data source to be objective, we applied the following research methods: observation method, analysis method, comparative analysis and synthesis method. After analyzing all segments that indicate the level of success of public relations management through social media, we can conclude that football clubs from the First Macedonian football league do not work enough on public relations and are far less successful compared to football clubs from the First Turkish Super League who recognized the importance of successfully managing public relations through social media for their club.

Keywords: Macedonian Football League, Super Turkish Football League, PR, Facebook, Instagram, Tik Tok.

INTRODUCTION

The trend of using social platforms has not bypassed sports clubs either. They allowed clubs to have two-way communication with their fans, which was not so developed before their appearance. In this way the clubs got the opportunity to hear the wishes of the fans or the suggestions they have regarding the club. Most clubs, international and domestic, are active

through various social platforms where they have their official profiles. Football is one of the most popular sports around the world, so football clubs have their fans in different countries, not only in the countries they come from. Social platforms have proven to be an excellent medium that will satisfy the needs of fans and enable better work and functioning of the club's public relations. With the advent of the Internet, clubs are trying to create and develop their own club media, whereby traditional media may be excluded from the communication process in the future. The reason for such a change in the introduction of new media as part of the club can be sought in the enabling of direct communication with fans offered by new social media such as YouTube, Facebook, Instagram, Tik Tok and others. Hussain (2015) assesses the impact of social media communication tools within the sporting industry. The study indicates that while social media is used as a communication tool, other platforms should be included in sports organizations' communication strategies. Social media has revolutionized the way sport organizations communicate with their fans, offering new methods for engagement and fan interaction. (Filo et al. 2015) If the club's public relations department makes an effort to inform the external and internal public about the latest events and, in addition, to cultivate the reputation and build a positive image for the club, it will result in a larger number of followers and much more attention and then it can to attract new fans and sponsors and thus meet its budget. Sports PR communication offers the football organization the opportunity to show the general public why it is different from others.

PUBLIC RELATIONS AND SOCIAL MEDIA

The digital world has changed communication within organizations and between organizations and their target groups (Cutlip, M. S., Center, H. A., Broom, M. G. 2003, 25). Public relations (PR) in sport has undergone a significant transformation with the rise of social media, changing the way sports organizations, athletes, and fans interact. Social media now plays a crucial role in shaping the image and reputation of teams, athletes, and events, offering new opportunities for engagement, brand building, and crisis management. Unlike traditional PR methods such as press releases and media interviews, social media provides a more direct, personal, and immediate way to communicate with audiences across the globe. PR in sport aims to maintain positive media coverage, build brand awareness, and increase fan engagement, while also handling public issues or crises. Social media platforms like Instagram, Twitter, Facebook, and TikTok enable sports organizations and athletes to communicate directly with their followers, bypassing traditional media outlets. This direct engagement fosters a deeper connection with fans and helps build a loyal community around a team or athlete. Social media has become a primary communication channel between sports organizations and their fans, providing opportunities for direct interaction, content sharing, and real-time engagement" (Kim & James, 2016, p. 350). **Pedersen (2016)** focuses on the significance of social media in the globalization of sports, stating social media enables sports organizations to reach global audiences, allowing them to expand their presence and influence into new markets. This perspective highlights the global dimension of social media in sports marketing and PR. One of the most significant benefits of social media in sports PR is fan engagement. Through social media, clubs and athletes can share behind-the-scenes content, match updates, personal stories, and interactive posts, leading to greater fan loyalty and engagement. In addition to fan interaction, social media serves as a powerful tool for personal branding, where athletes can share content that promotes their careers, values, and sponsorships, which in turn attracts new endorsement deals and career opportunities. Likewise, sports organizations can use social media

to promote their image, values, and community involvement. Houshmand Sarkhoosh et al. (2023) examine the role of social media in professional sports, stating that "social media has become an integral part of our lives, serving as a significant hub for individuals and businesses to share information, communicate, and engage." They emphasize the importance of understanding user demographics and preferences to effectively utilize AI-based tools for content generation and enhancing user experiences on social media platforms. Arora et al. (2014) analyze the impact of online social media on the Indian Premier League (IPL), noting that "online social media has played a pivotal role in sharing of information and opinions on real-time events." They highlight how social media platforms like Facebook and Twitter are used to discuss events such as the IPL, influencing public perception and engagement. Crisis management has also become more efficient thanks to social media. Sports PR teams can respond in real-time to any controversies, issues, or negative incidents involving athletes or teams. Social media offers a platform to address problems promptly and prevent them from escalating, safeguarding the reputation of the involved parties. This immediacy and transparency are vital in protecting a team's or athlete's image in the face of public scrutiny. Moreover, social media has allowed sports organizations to reach a global audience. This expanded visibility has contributed to the rise in popularity of various sports, especially smaller leagues or sports that previously had limited exposure. Fans from all over the world can follow their favorite teams, share content, and interact with athletes, enhancing the sport's global footprint. Trivedi et al. (2021) explore the role of social media communications in the success of professional sports leagues, stating that "social media communications have a significant effect on sports involvement and online community engagement." They discuss how sports organizations leverage social media to enhance fan engagement and brand presence. Athletes themselves play an integral role in sports PR through their social media presence. With large followings, athletes can serve as influencers, driving marketing campaigns and connecting with new audiences. This partnership between sports teams, influencers, and athletes creates new fan segments and increases the reach of marketing efforts. Social media also offers real-time updates, such as match scores, player stats, and highlights. These live updates keep fans engaged during events and help maintain interest even between games. Interactive content like polls, live streams, and Q&A sessions enhances the overall fan experience, making it more dynamic and engaging. However, the integration of social media into sports PR also presents challenges. One of the key issues is managing negative comments and criticism. Social media can amplify any form of backlash, and PR teams must respond quickly and efficiently to protect the reputation of athletes or teams. Maintaining consistency across various platforms and ensuring a unified brand voice is another challenge, especially for larger organizations with multiple stakeholders. Inconsistent messaging can confuse fans and undermine PR efforts. Another challenge is the balance between personal and professional content. Athletes often use social media to share personal stories, which can sometimes lead to controversies if the content is misinterpreted or conflicts with their professional image. Managing this balance is crucial to maintaining a positive public image without infringing on an athlete's right to personal expression. Lastly, there are ethical considerations surrounding privacy, especially when sharing sensitive or personal information on social media. Athletes and sports organizations must be careful not to overexpose private details or violate ethical boundaries, as this can negatively impact their reputation and relationships with fans and sponsors. In conclusion, social media has revolutionized PR in sports by offering a more direct and immediate way to engage with fans, build brands, and manage crises. However, the fast-paced and global nature of social media requires careful strategy and management. PR

professionals in the sports industry must be proactive, creative, and adaptable to effectively utilize social media while addressing potential risks and challenges. Properly leveraging social media can enhance fan engagement, increase visibility, and strengthen the overall public image of sports organizations and athletes. However, many clubs and organizations still do not understand the role and importance of public relations, so they often remain insufficiently noticed, developed and recognized. (Hopwood, Skinner, Kitchin,, 2010, 3)

SUBJECT AND OBJECTIVES OF THE RESEARCH

The subject of the research is the official social platforms profiles of the Macedonian First League football clubs and the Turkish First Super League football clubs.

The main goal of the research is to present the current state of public relations management on social nmedia among football clubs from the First Macedonian League and football clubs from the First Turkish Super League, as well as to make a comparison between the two leagues.

METHODS

In order for the data source to be objective, we applied the following research methods: observation method, analysis method, comparative analysis and synthesis method. For a sample of respondents in this research, 30 football clubs are included, which compete in the First Macedonian Football League and the First Turkish Football Super League in the 2022/23 season.

RESULTS AND DISCUSSION

The results gathered from the above searches are presented in six separate tables representing the main areas of findings:

- Information about the profiles of football clubs from the First Macedonian league in the 22/23 season on the Facebook;
- Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on the Facebook;
- Information about the profiles of football clubs from the First Macedonian league in the 22/23 season on the Instagram;
- Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on the Instagram;
- Information about the profiles of football clubs from the First Macedonian league in the 22/23 season on the Tik Tok;
- Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on the Tik Tok;

Table 1. Information about the profiles of football clubs from the First Macedonian League in the 22/23 season on Facebook; (*Source: author's work*, 2023)

facebook	FOLLOWERS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION
FC SHKUPI	32 K	✓	✓	✗
FC TIKVES	3,8 K	✓	✓	✗
FC SKOPJE	-	-	-	-
FC STRUGA	10 K	✓	✓	✗
FC POBEDA	3,8 K	✗	✗	✗
FC BREGALNICA	6,1 K	✓	✓	✗
FC ACADEMY PANDEV	8,2 K	✓	✓	✗
FC SILEKS	3,5 K	✓	✓	✗
FK SHKENDIJA	111 K	✓	✓	✓
FC RABITNICKI	13 K	✓	✓	✗
FC MAKEDONIJA GP	4,8 K	✓	✓	✗
Total	max 111 K min 3,5 K	9	9	1

The analysis of Facebook profiles of football clubs from the First Macedonian League for the 2022/23 season highlights several key shortcomings in how these clubs manage their social media presence and communicate with their audience. The highest number of followers recorded on the Facebook profiles of Macedonian clubs was 111K (FC Shkendija), while the lowest number of followers was just 3.5K for FC Silex. This significant gap demonstrates a lack of consistency and strategic effort in attracting followers and building an engaged fan base. While FC Shkendija stands out in terms of followers, other clubs in the league struggle to maintain an active and growing digital presence. Regarding the sharing of information about upcoming matches and results, only nine clubs consistently provide this information to their followers. This irregularity in communication limits the ability of clubs to engage with fans and keep them informed, something that should be a standard practice for any club in the digital age.One of the most concerning findings is the lack of profile verification. Unlike Turkish clubs, which all have verified profiles on Facebook, only FC Shkendija has a verified profile among Macedonian clubs. This is a significant indicator of how poorly many clubs manage their digital presence and how it affects their credibility and trustworthiness with their followers. In conclusion, Macedonian football clubs lag behind in their use of Facebook for fan engagement and public relations. They need to focus on increasing their social media activity, providing regular updates on matches and results, and verifying their profiles to build credibility and trust. FC Shkendija's

higher level of engagement and verified profile should serve as a model for other clubs in the league to improve their digital presence and communication strategies.

Table 2. Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on Facebook; (*Source: author's work*, 2023)

facebook	FOLLOWERS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION
ANTALYASPOR	71 K	✓	✓	✓
GALATASARAY S.K	12 M	✓	✓	✓
ADANA DEMIRSPOR	85 K	✓	✓	✓
ALANYASPOR	55 K	✓	✓	✓
ANKARAGÜCÜ	83 K	✓	✓	✓
BEŞIKTAŞ J.K	5,5 M	✓	✓	✓
FATIH KARAGÜMRÜK S.K	20 K	✓	✓	✓
GAZIANTEP F.K	57 K	✓	✓	✓
GIRESUNSPOR	137 K	✓	✓	✓
HATAYSPOR	132 K	✓	✓	✓
ISTANBUL BAŞAKŞEHIR F.K	148 K	✓	✓	✓
İSTANBULSPOR A.Ş.	16 K	✓	✓	✓
TRABZONSPOR	1 M	✓	✓	✓
KONYASPOR	248 K	✓	✓	✓
KASIMPAŞA S.K	61 K	✓	✓	✓
FENERBAHÇE S.K	8,6 M	✓	✓	✓
SIVASSPOR	265 K	✓	✓	✓
KAYSERI S.K	43 K	✓	✓	✓
ÜMRANIYESPOR	32 K	✓	✓	✓
Total	max 12 M min 20 K	19	19	19

The analysis of Facebook profiles of football clubs from the First Turkish Super League for the 2022/23 season reveals a highly professional approach to managing social media presence and engaging with fans. Unlike Macedonian clubs, Turkish clubs use Facebook effectively to communicate with their audience and provide relevant information. The highest number of followers on Facebook profiles of Turkish clubs was recorded for Galatasaray (12M), while the lowest number of followers was observed for Fatih Karagümrük (20K). Despite the lower number of followers, Fatih Karagümrük still shows a considerable presence compared to Macedonian clubs. This suggests that Turkish clubs, even with fewer followers, maintain a more consistent and professional digital presence than their Macedonian counterparts. Regarding information about upcoming matches and results, all 19 clubs in the Turkish First Super League consistently provide their followers with updates. This is a notable difference when compared to Macedonian clubs, where this information is often not shared regularly. Turkish clubs prioritize keeping their fan base informed, which likely contributes to their higher engagement and trustworthiness. Verification is another significant point where Turkish clubs excel. All football clubs in the First Turkish Super League have verified Facebook profiles, indicating a professional and credible approach to their online presence. This is in stark contrast to Macedonian clubs, where verification on social media platforms is often missing, potentially reducing their credibility and fan trust. In conclusion, Turkish clubs demonstrate a highly organized and professional use of Facebook for fan engagement and public relations. Their consistent posting of relevant match information, high levels of follower engagement, and verified profiles set them apart from Macedonian clubs, which lag behind in digital communication strategies. Macedonian clubs can learn from the Turkish model by improving their activity, content quality, and profile management to increase their digital presence and fan engagement.

Table 3. Information about the profiles of football clubs from the First Macedonian League in the 22/23 season on the Instagram; (*Source: author's work*, 2023)

Instagram	FOLLOWERS	POSTS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION
FC SHKUPI	32,9 K	2,966	✓	✓	✗
FC TIKVES	2,138	559	✓	✓	✗
FC SKOPJE	822	54	✓	✓	✗
FC STRUGA	3,854	860	✓	✓	✗
FC POBEDA	1,558	74	✓	✓	✗
FC BREGALNICA	1,636	80	✓	✗	✗
FC ACADEMY PANDEV	5,932	499	✓	✓	✗
FC SILEKS	1,262	172	✓	✓	✗
FK SHKENDIJA	33,6 K	4,435	✓	✓	✓
FC RABITNICKI	2,207	988	✓	✓	✗
FC MAKEDONIJA GP	10,1 K	839	✓	✓	✗
Total	max 33,6 K min 822	max 4,435 min 54	11	10	1

The analysis of Instagram profiles of football clubs from the First Macedonian League for the 2022/23 season reveals significant shortcomings in using this social network for public relations and fan engagement. Compared to Turkish clubs, which actively use Instagram and other social platforms, Macedonian clubs show low activity and poor management of their profiles. The highest number of followers on Instagram profiles of Macedonian clubs was recorded for FC Shkendija (33.6K), while the lowest number of followers (822) was observed for FC Skopje. This indicates a significant difference in popularity on the platform, which can be directly attributed to inactivity and poor profile management. The difference in follower numbers shows that creative and consistent content is key to attracting new followers, as seen with FC Shkendija, which has the most posts and followers. The number of posts is also correlated with the number of followers. FC Shkendija has a maximum of 4,435 posts, reflecting their consistency and active use of Instagram for communication with fans. In contrast, FC Skopje has only 54 posts, a very low number that points to underutilization of the platform's potential for informing and engaging the audience. In terms of sharing information about upcoming matches and results, 11 of the clubs share details about upcoming matches, while only 10 share information about the results. Although there are some posts with this information, the lack of regular and transparent communication limits the opportunity to better connect with fans and increase audience loyalty. Regarding verification, similar to Facebook, only FC Shkendija has a verified profile on Instagram, demonstrating their professional approach and seriousness in managing social media. The lack of verification on other clubs' profiles suggests a lack of credibility and trust in their accounts. In comparison with Turkish clubs, where all Super League clubs' profiles are verified, are actively used to inform the public, and have millions of followers and posts, Macedonian clubs are significantly lagging behind. The examples of Turkish clubs show how consistent activity, creativity, and transparency can lead to increased visibility and fan engagement. In conclusion, Macedonian football clubs need to recognize the importance of Instagram as a key platform for public relations and fan communication. Increased profile activity, creativity in content, and regular communication with the audience will enable them to expand their digital reach and improve their interaction with their fan base.

Table 4. Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on the Instagram; (*Source: author's work*, 2023)

Instagram	FOLLOWERS	POSTS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION
ANTALYASPOR	121 K	11,9 K	✓	✓	✓
GALATASARAY S.K	12,6 M	24,5 K	✓	✓	✓
ADANA DEMIRSPOR	325 K	7,284	✓	✓	✓
ALANYASPOR	82,5 K	5,799	✓	✓	✓
ANKARAGÜCÜ	182 K	6,216	✓	✓	✓
BEŞIKTAŞ J.K	5,6 M	20,1 K	✓	✓	✓
FATIH KARAGÜMRÜK S.K	81,9 K	3,304	✓	✓	✓
GAZIANTEP F.K	121 K	7,503	✓	✓	✓
GIRESUNSPOR	110 K	6,512	✓	✓	✓
HATAYSPOR	171 K	6,121	✓	✓	✓

	İSTANBUL BAŞAKŞEHIR F.K	219 K	10,2 K	✓	✓	✓
	İSTANBULSPOR A.Ş.	40,8 K	3,683	✓	✓	✓
	TRABZONSPOR	1,1 M	12,8 K	✓	✓	✓
	KONYASPOR	207 K	12,2 K	✓	✓	✓
	KASIMPAŞA S.K	62,8 K	10.7 K	✓	✓	✓
	FENERBAHÇE S.K	8,6 M	24 K	✓	✓	✓
	SIVASSPOR	175 K	15,6 K	✓	✓	✓
	KAYSERI S.K	113 K	8,162	✓	✓	✓
	ÜMRANIYESPOR	51,9 K	3,726	✓	✓	✓
	Total	max 12,6 M min 40,8 K	max 24,5 K min 3,304	19	19	19

The analysis of the Instagram profiles of football clubs from the First Turkish Super League for the 2022/23 season reveals a high level of professionalism and consistency in using this platform for public relations and fan communication. Compared to other social networks, Instagram stands out as an effective tool for reaching a wide audience and engaging with fans. The highest number of followers was observed at Galatasaray (12.6M), positioning the club at the top in terms of digital popularity. In comparison, the lowest number of followers (40.8K) was recorded for İstanbulspor, which still performs better in terms of followers than on Facebook. This suggests that Instagram, with its visual appeal and broad reach, is a more suitable platform for Turkish clubs to engage their audience. The number of posts also correlates with the number of followers. Galatasaray again leads with a maximum of 24.5K posts, reflecting their consistency and activity on the platform, while Fatih Karagümrük has the smallest number of posts (3,304). This indicates that clubs with larger followings tend to use the platform more frequently and diversely to share content. When it comes to informing the public about match results and upcoming fixtures, all Turkish clubs demonstrate excellent communication. No club was observed to neglect keeping their fans informed, showcasing the importance they place on transparency and timely sharing of information. Verification is another aspect that demonstrates the seriousness of clubs in managing their Instagram profiles. As with Facebook, all profiles of clubs in the Turkish Super League are verified, adding to their credibility and trustworthiness among followers. In comparison with Macedonian clubs, which largely overlook using Instagram as a platform for public relations, Turkish clubs provide an example of professional management and strategic use of social media. Macedonian clubs can learn from these examples,

particularly in terms of post frequency, content quality, and the importance of keeping the public informed. In conclusion, Turkish football clubs demonstrate that Instagram is a powerful tool for enhancing digital presence, building relationships with fans, and increasing club visibility. Consistent activity, creativity, and transparency are key factors contributing to their success.

Table 5. Information about the profiles of football clubs from the First Macedonian League in the 22/23 season on the Tik Tok; (*Source: author's work*, 2023)

Tik Tok	FOLLOWERS	POSTS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION	LIKES
FC SHKUPI	-	-	-	-	-	-
FC TIKVES	-	-	-	-	-	-
FC SKOPJE	-	-	-	-	-	-
FC STRUGA	1262	28	✗	✓	✗	11,7 K
FC POBEDA	-	-	-	-	-	-
FC BREGALNICA	-	-	-	-	-	-
FC ACADEMY PANDEV	-	-	-	-	-	-
FC SILEKS	-	-	-	-	-	-
FK SHKENDIJA	-	-	-	-	-	-
FC RABITNICKI	-	-	-	-	-	-
FC MAKEDONIJA GP	-	-	-	-	-	-
Total	max 1262 min /	max 28 min /	0	1	0	max 11,7 K min /

The analysis of TikTok profiles of football clubs from the First Macedonian League for the 2022/23 season reveals a significant underutilization of this social network as a tool for public relations and fan engagement. Compared to the Turkish Super League clubs, where TikTok is actively used for innovative and engaging communication, Macedonian clubs lag far behind in adopting modern digital trends. Only one club, FC Struga, has a presence on TikTok, highlighting a major gap in social media strategy among Macedonian football clubs. However,

even FC Struga's profile reflects limited activity, with only 28 posts and 1262 comments, suggesting a lack of consistent and strategic use of the platform. This contrasts sharply with Turkish clubs like Galatasaray, which actively post hundreds of videos, resulting in millions of followers and likes. The absence of key content types is another critical issue. Unlike many Turkish clubs, which balance entertaining and informative content, FC Struga does not provide updates about upcoming matches and rarely posts information about achieved results. This demonstrates a missed opportunity to connect with fans by offering valuable and timely updates. Verification, a key factor that boosts credibility and trust, is completely absent among Macedonian football clubs on TikTok. In comparison, 9 out of 11 Turkish clubs with TikTok profiles have verified accounts, reflecting their professional approach to social media management. The creativity of TikTok videos plays a vital role in engagement, as seen with smaller Turkish clubs like FC Umraniyespor, which achieve significant follower growth despite limited resources. However, FC Struga's content lacks the innovative and fan-centric approach necessary to attract and retain followers. The club's total of only 11.7 likes across all videos underscores the need for a more dynamic and creative content strategy. In conclusion, Macedonian football clubs must recognize the importance of TikTok as a modern platform for public relations and fan interaction. By studying successful examples from Turkish clubs, they can develop strategies to improve their presence, such as increasing post frequency, diversifying content to include both entertaining and informative elements, and prioritizing account verification. With better use of creativity and data-driven strategies, Macedonian clubs can leverage TikTok to enhance their visibility, strengthen fan relationships, and compete on a digital level both locally and internationally.

Table 6. Information about the profiles of football clubs from the First Turkish Super League in the 22/23 season on the Tik Tok; (*Source: author's work*, 2023)

Tik Tok	FOLLOWERS	POSTS	INFORMATION FOR NEXT MATCH	INFORMATION FOR RESULTS	VERIFICATION	LIKES
ANTALYASPOR	–	–	–	–	–	–
GALATASARAY S.K	1,5 M	440	✓	✓	✓	26,8 M
ADANA DEMIRSPOR	–	–	–	–	–	–
ALANYASPOR	–	–	–	–	–	–
ANKARAGÜCÜ	8138	103	✓	✓	×	163,3 K
BEŞIKTAŞ J.K	604,2 K	119	✓	✓	✓	7,1 M
FATIH KARAGÜMRÜK S.K	–	–	–	–	–	–
GAZIANTEP F.K	–	–	–	–	–	–
GIRESUNSPOR	2068	11	×	×	✓	7793
HATAYSPOR	–	–	–	–	–	–
İSTANBUL BAŞAKŞEHIR F.K	46,1 K	28	✓	×	✓	691,5 K
İSTANBULSPOR A.Ş.	–	–	–	–	–	–
TRABZONSPOR	63,2 K	81	✓	✓	✓	1,0 M
KONYASPOR	28,1 K	237	×	×	✓	369,8 K
KASIMPAŞA S.K	–	–	–	–	–	–
FENERBAHÇE S.K	1,1 M	250	×	×	✓	16,3 M
SIVASSPOR	34,5 K	423	×	×	✓	426,2 K
KAYSERI S.K	2020	27	✓	×	×	17,4 K
ÜMRANIYESPOR	723,8 K	270	✓	✓	✓	13,9 M
Total	max 1,5 M min 2020	max 440 min 11	7	5	9	max 26,8 M min 7793

The analysis of the TikTok profiles of football clubs from the First Turkish Super League for the 2022/23 season highlights significant variations in the way clubs utilize this social network, reflecting differences in strategy, creativity, and engagement levels. The data clearly shows that successful management of TikTok profiles can significantly enhance a club's visibility and fan engagement. Galatasaray emerges as the most prominent club on TikTok, leading in key metrics such as the number of followers (1.5M), posts (440), and likes (26.8M). This success is a result of the club's consistent efforts to create engaging and creative content,

coupled with its large fan base. In contrast, FC Kayseri and FC Giresunspor, with the lowest number of followers (2020) and likes (7793) respectively, demonstrate the challenges smaller or less active clubs face in leveraging TikTok effectively. Content strategy appears to play a critical role in audience engagement. While most clubs focus on entertaining videos such as interviews, challenges, and behind-the-scenes footage, fewer clubs provide essential information about upcoming matches (7 clubs) and results (5 clubs). This indicates a missed opportunity for some teams to balance entertainment with informative content that can further strengthen their connection with fans. Verification status is another key indicator of the clubs' commitment to managing their social media presence. Of the 11 clubs active on TikTok, 9 have verified profiles, demonstrating a professional approach to social media management. This verification not only boosts credibility but also fosters trust among followers. Interestingly, some smaller clubs, like FC Umraniyespor, showcase exceptional creativity in their content, allowing them to compete with larger clubs in terms of engagement despite their limited resources and status. This emphasizes that innovative and fan-focused content can bridge the gap between clubs of different sizes. In summary, the success of a TikTok profile depends on a club's ability to maintain a balance between creative, entertaining content and informative updates, alongside a professional approach to account management. Larger clubs like Galatasaray have the advantage of an established fan base, but smaller clubs with innovative strategies, such as FC Umraniyespor, demonstrate that effective social media management can level the playing field. For clubs like FC Kayseri and FC Giresunspor, investing in creativity and consistency could significantly enhance their digital presence and engagement.

CONCLUSIONS

After analyzing the profiles of football clubs from the first leagues in Macedonia and Turkey, we can conclude that the number of followers is not random. The quality of the content offered by the Turkish clubs on their social network profiles is incomparably better than what can be seen on the profiles of the Macedonian clubs. The number of clubs where public relations work at the same level as in Turkish clubs is small, and these are actually the ones with the most followers in Macedonia. After analyzing all segments that indicate the level of success of public relations management through social networks, we can conclude that football clubs from the First Macedonian Football League do not work enough on public relations and are far less successful compared to football clubs from the first Turkish Super League who recognized the importance of successfully managing public relations through social media for their club. In summary, we can conclude that with the help of public relations through social networks, clubs achieve high results, and thanks to football, they found their place in sports and proved that they have become an essential element in the functioning of clubs and establishing communication with the public. Macedonian football clubs can adopt several strategies to improve public relations through social media, following the successful examples of Turkish clubs. First, it is essential to professionalize digital marketing and PR teams by hiring specialists in digital communications and providing training to existing staff on the latest trends in this field. Regular and interactive content posting is crucial, with the creation of diverse and creative content such as videos, interviews, and interactive polls to increase audience engagement. Sharing behind-the-scenes moments from the team will further strengthen the emotional connection with fans. Investing in data analysis tools is necessary to better understand fan interests and behavior, as well as to implement targeted campaigns that will enhance engagement. Brand-building and

loyalty campaigns, such as online and offline contests, giveaways, or meet-and-greet events with players, can significantly boost the sense of belonging. Additionally, encouraging fans to create and share content using club hashtags will further amplify their involvement. In crisis situations, it is vital to respond quickly and transparently through social media to avoid speculation and negative reactions. Localizing content, through posts in the Macedonian language and highlighting local cultural values, will help strengthen the connection with the local community. Collaborating with local influencers and sponsors through creative partnerships can expand the reach and increase the popularity of the clubs. Investing in mobile applications or digital platforms, where fans can access exclusive content, news, and tickets, will improve interaction with them. Promoting humanitarian activities and socially responsible projects through social media will help strengthen the clubs' positive image. Finally, regularly monitoring results and adapting strategies based on fan feedback and content performance is crucial for the success of these activities. Implementing these strategies can enhance the popularity and influence of Macedonian football clubs both locally and internationally.

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Section A

DIFFERENT PERCEPTION REGARDING EMPLOYMENT OPPORTUNITIES – UNEMPLOYED INDIVIDUALS AND EMPLOYERS

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Abstract

A frequent problem faced by employers in the labor market in the Republic of North Macedonia are candidates who possess formal knowledge but lack the necessary skills, abilities and knowledge. In short – they lack the competencies required for successful performance in a specific job position. In every hiring process, employers first assess the competencies possessed by the job candidate, or the potential that determines whether they will be successful in the workplace. It should be emphasized that competencies encompass skills, abilities, knowledge and personal traits that match the job requirements, determining whether a specific candidate is suitable for the job or needs to improve some skills and develop competencies necessary for the position. Most of the technical competencies should ideally be acquired during formal education i.e. undergraduate studies for the majority of citizens in Macedonia. The entire problem regarding the different perceptions of employment opportunities between the two sides of this issue – the unemployed and the employers – lies in the different assessment of the candidate's competencies from both sides (often including a lack of awareness of the competencies required for the job being applied for by the candidates). The analysis in this paper is focused on this extremely relevant issue, with an emphasis on the fact that quality education based on real needs is the foundation for a healthy economy, a healthy labor market and progress in any country.

Keywords: employment, skills, employers, profiles, competencies

INTRODUCTION

Over the past decade, the phenomenon has become increasingly apparent in Macedonia where a significant portion of both the unemployed and the employed individuals do not adequately understand the labor market and its dynamics. This same phenomenon has also been observed among employers. In fact, there are two different situations:

Unemployed and employed individuals seeking better employment opportunities face disappointment and frustration because, according to them, there are no job positions in the labor market that match their education and desired conditions.

Employers who are frustrated and surprised because there are no suitable candidates for their positions in the labor market, or there are enough candidates, but they do not accept the competitive and excellent working conditions they offer.

Hence, the stance arises that there is a genuine misunderstanding of the labor market on both sides – both from the perspective of employers and job seekers. Unemployed individuals claim that there are no job positions available while considering themselves adequately competent for the positions they apply for, often receiving no response. On the other hand, the real sector argues that there are jobs available, but there is a lack of workers. Additionally, these data do not only refer to the "undesirable" positions as categorized by some unemployed individuals or so-called positions for unskilled labor such as cashiers, production operators, delivery personnel and salespersons, but also to higher-level positions such as managerial, technical and highly skilled positions.

Just twenty years ago, a diploma meant competitiveness and better positioning in the labor market in Macedonia. This was because individuals who completed university studies had deeper knowledge in their field compared to those with only a high school education. This knowledge advantage enabled them to adapt to the workplace more quickly, successfully master work systems, and find opportunities for advancement in their careers. However, in recent years, merely having a formal university education is no longer sufficient to secure desired job positions, largely because such graduates are often practically inexperienced in their studied field and unprepared for the workplace. Universities do not offer enough practical training and fail to build skills among students. Those with a university degree in a specific field and some relevant experience—such as internships, volunteer work, project involvement, informal education and training—have a better chance of employment. In such a situation, companies are an inevitable part of the problem, both as entities that contribute to its creation and deepening with their ignorance and greed, and as entities that can offer a potential solution.

There are two types of companies in the labor market:

1. Some companies, although aware of the situation in the labor market, are still unwilling to offer better conditions for the rare staff they seek, exacerbating the existing problem. Most often these companies have a high degree of fluctuation and often face a lack of staff.
2. Other companies do not wait for the state to solve their business needs and proactively react with unique strategies to independently create the staff they need. One way to attract suitable staff, which is scarce in the market, is to increase salaries and job benefits, but it goes beyond that. Examples abound: some companies sponsor entire classes in high schools and universities to attract young people to study specific fields, while others have developed comprehensive training programs within the company to train young people without work experience but with detected potential and so on. Many companies also use consulting services to attract, retain, or invest in suitable talent.

In this context, it is important to emphasize that while the state has the power to create measures and policies to some extent, companies have a responsibility to offer suitable conditions and proactively create suitable talent for their needs. However, the real solution to the problem largely lies in the decisions each individual makes throughout their career: from their initial choice of field of study and education and then throughout their career path in the direction of building competencies.

ANALYSIS OF THE CURRENT STATE OF THE LABOR MARKET IN THE REPUBLIC OF NORTH MACEDONIA FROM TWO PERSPECTIVES – UNEMPLOYED INDIVIDUALS AND EMPLOYERS

Human resources and investment in advancing their knowledge and skills are crucial for short-term and long-term success in company operations. From the perspective of

identifying future needs for new hires and skills requirements, it is significant to consider both past and expected changes in employer development.

The global economic and energy crisis has led to economic slowdowns and inflationary pressures on a global scale. Employers in Macedonia are facing new challenges, coping with the negative effects of the economic-energy crisis and price pressures.

The key to achieving competitiveness and sustainability in the 21st century is for employees to possess technical, soft, digital, entrepreneurial, business and other complementary skills. However, practice shows that there exists a gap between the skills needed by businesses and those possessed by participants in the labor market, including employees. Such a skills gap leads to reduced productivity and less added value for companies, as well as a deficit of staff in certain sectors and occupations. Therefore, aligning the supply and demand for skills, both within companies and across the entire labor market, should be one of the main priorities of national-level policy.

The most comprehensive survey of skills needs in the labor market and alignment between labor supply and demand is conducted by the Employment Agency, which surveyed 2 932 employers in 2023. Of these, 1 337 respondents or 45.6%, expect to realize 14 915 new hires in various occupations and skill levels in the next 12 months.

By employer size, small employers are expected to realize 3 211 hires or 21.5%, medium-sized employers anticipate 5 281 hires or 35.4% and large employers expect to realize 6 423 hires or 43.1% of the total number of expected hires in the next 12 months. Analyzed by activity, the largest number of hires are expected in the manufacturing industry – 7 642 or 51.2% and in wholesale and retail trade, where 1 667 hires or 11.2% of planned hires are expected. Then, in administrative and support service activities, employers expect 1 436 hires or 9.6%, in information and communication activities 912 hires or 6.1%, in construction 728 or 4.9% of expected hires in the next 12 months. In other activities employers expect a relatively smaller number of hires.

Analyzed by activity and the corresponding level of required knowledge, in the manufacturing industry where the largest number of hires are expected, the greatest need will be for staff with elementary and secondary education, accounting for 45.5% and 44.5% of expected hires, respectively, in this activity.

In wholesale and retail trade and in construction, the greatest need will be for workers with secondary education - 74.9% i.e. 64.3% of planned hires in these activities, respectively. In administrative and support service activities, 78.3% of planned hires are for workers with secondary and higher education. Employers in information and communication activities, education, professional, scientific and technical activities, financial activities and insurance activities will have the most need for hires with undergraduate and postgraduate university education.

According to the level of required knowledge (education), out of a total of 14 915 expected hires, 4 277 (28.7%) will be for individuals with completed primary education, 6770 hires (45.4%) will be for individuals with secondary education, 2258 hires (15.1%) are expected for individuals with secondary and post-secondary education, including university education, and 1610 hires (10.8%) are expected to be for individuals with undergraduate and postgraduate university education.

The previously conducted analysis is presented in Table 1.

Table 1. Expected employment by activities and level of education for 2024

Activity/Sector	Number of employers who expressed a need for workers	Expected employment	Degree of required knowledge (education)			
			Elementary	Secondary	Secondary and post-secondary	University
Total	1337	14915	4277	6770	2258	1610
Agriculture, hunting, forestry and fishing	26	285	131	138	6	10
Mining and quarrying	11	133	27	51	32	23
Processing industry	419	7642	3477	3400	560	205
Supply of electricity, gas, steam and air conditioning	1	3	3	0	0	0
Water supply, waste water disposal, waste management and environmental remediation activities	10	49	32	5	10	2
Construction	110	728	160	468	33	67
Wholesale and retail trade, repair of motor vehicles and motorcycles	248	1667	159	1249	147	112
Transport and storage	116	505	34	427	40	4
Accommodation facilities and food service activities	121	505	83	408	12	2
Information and communications	64	912	2	115	45	750
Financial activity and insurance activities	25	227	1	75	62	89
Professional, scientific and technical activities	61	255	7	29	36	183
Administrative and auxiliary service activities	33	1436	121	138	1124	53
Education	15	54	0	12	3	39
Health and social care activities	57	183	18	59	61	45
Art, entertainment and recreation	10	287	14	166	86	21
Other service activities	10	44	8	30	1	5

Source: Employment Agency of the Republic of North Macedonia

The data from such research provide useful short-term indicators for employers' expectations regarding new hires and the skills needed by individuals to be competitive in the labor market. In fact, these data serve as the basis for creating active employment programs and

measures aimed at enhancing the skills of unemployed individuals to increase their competitiveness in the labor market and contribute to the creation of conditions for its better functioning, through matching the supply and demand of appropriately qualified workforce. The results of the research are necessary to be used in the educational system when designing enrolment policies and creating new educational programs for occupations aligned with the needs of the labor market.

The shortage of qualified workforce is also a problem in the European Union. Thus, over 77% of companies in the EU have stated that they have difficulty finding qualified staff with the necessary skills. In 2021 and 2022, employers faced a labor shortage for 28 occupations in several sectors, with some of the problematic sectors being construction, healthcare, engineering and IT, indicating a mismatch between demand and supply in the labor market. Regarding digital skills, 40% of adults and 33% of employed individuals in the EU lacked basic digital skills, meaning that every 10th adult and every third employed person in EU companies did not have adequate basic digital skills. According to Eurostat, only 37% of adults in the EU participated in training processes to improve their skills. In Macedonia, this number is significantly lower, standing at 2.5%.

However, it is encouraging that the mentality is slowly changing, as evidenced by the fact that in 2023, two-thirds of students enrolled in vocational schools, while the rest enrolled in gymnasiums and artistic education. The focus now should be on the quality of practical training and increasing the hours of internships to provide concrete familiarity with the work process. The European Commission declared 2023 as the European Year of Skills to assist companies, especially small and medium-sized enterprises, in finding suitable staff and to enhance the competitiveness of the workforce. In the EU, there is also a demand for so-called green skills, and the digital and green transition will additionally create new jobs with new qualifications. The EU also emphasizes so-called transferable skills. The goal is for two-thirds of jobs by 2030 to involve good communication, critical thinking, responsibility, accuracy, leadership, data literacy and risk-taking. These new skills will certainly require more flexible education. Within the framework of the European Year of Skills, the EU has adopted social objectives until 2030, aiming for 60% of adults to participate in training, with the digital skills target set at 80%, to increase the employment rate to at least 78% of the population aged 20 to 64 years. The European Commission also focuses on requalification and upskilling because lifelong learning is crucial for research and development.

In this context, it is important to emphasize the fact that economically developed countries are essentially built on advanced systems of vocational education and high-quality practical training. However, for this to be the case, they are aware that sustainable financial resources are needed and therefore invest in education. According to the latest data from Eurostat, Switzerland allocates 5.4% of GDP to education, Germany allocates 4.3%, Austria - 4.8%, Finland - 5.6%, while Denmark allocates as much as 6.3%. Additionally, besides the public funds they receive from the government, companies have a highly developed awareness to invest in the modernization of vocational education and training for one practical reason: to ensure a skilled workforce that will contribute to increased productivity because they know that every retraining or upskilling of personnel requires time and additional resources for the company itself. The added value of their investments is the increase in production and the quality of products. And that's why they are successful.

Fundamentally, both unemployed and employed individuals need to possess a complementary set of specific and multidisciplinary knowledge, skills and abilities to meet the needs and demands of employers and, above all, the work process itself. These are presented in Table 2.

Table 2. Required skills and abilities desired by employers

Soft skills	Professional skills	Digital skills	Entrepreneurial skills
Teamwork	Professional knowledge and skills related to workplace needs	Knowledge and skills related to technology within the company	Proactivity, initiative and flexibility
Communication skills	Professional knowledge and skills related to specific equipment and processes	Quick adoption of new technologies	Creativity and innovation focus
Meeting deadlines		Computer knowledge and skills	Business knowledge and skills (finance and investments, business planning, marketing, market research)
Independence			
Acceptance and adaptation to changes			
Taking initiative			
Work analysis			

Through conducting training to acquire the aforementioned skills, both unemployed and employed individuals will more easily meet the challenges of available job positions, thereby overcoming the discrepancy in perception regarding required competencies between employers on one side and unemployed or employed individuals on the other. However, differences in perception will always exist, as employers often cite the following reasons as stereotypes for not securing the needed workforce:

- Lack of interest and motivation among candidates to perform tasks in specific occupations;
- Shortage of candidates possessing practical knowledge and skills required for tasks in specific occupations;
- Shortage of candidates with relevant work experience;
- Shortage of candidates with appropriate education;
- Shortage of candidates willing to work for the offered salary.

Despite the existence of such attitudes and discrepancies, employers are still aware that human resources and investment in advancing their knowledge and skills are crucial for both short-term and long-term success in their companies.

CONCLUSION

The analysis of the mismatch between supply and demand in the labor market and the different perceptions regarding employment opportunities between the unemployed individuals and employers is exceptionally significant and relevant as it directs towards quality education that meets the requirements of the real sector, ultimately leading to a healthy economy and progress of the country as a whole. The conclusion drawn from such analysis points towards the fact that the unemployed are often dissatisfied with the available

jobs and conditions offered in the labor market, while employers believe that without additional training and upskilling, they cannot provide suitable profiles that meet the demands of the work process in their companies. In such circumstances, it is the responsibility of the state to create measures and policies to align both sides of the labor market, while companies are responsible for offering suitable conditions and through proactive actions, creating adequate personnel for their needs. However, the real solution to the problem largely lies in the decisions individuals make throughout their careers: from the initial choice of field of study and education, to adapting to the real demands and needs during their career path. This includes acquiring new additional skills demanded by the labor market, enabling an unemployed individual to profile themselves as a competent candidate capable of meeting the requirements of a specific job. This means that today's real sector cannot provide the necessary workforce if it relies solely on formal education; instead, by supplementing knowledge through training and requalification, which develop new skills, a complete profile capable of fulfilling work tasks can be built, contributing to the success and progress of the specific company.

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Section A

THE SIGNIFICANCE OF THE MOTHER-DAUGHTER RELATIONSHIP AND THE LOSS OF THE MOTHER THROUGH THE PRISM OF THE NOVEL "BELLA SAMA" BY VIOLETA TANCHEVA-ZLATEVA

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Abstract

The subject of interest in the scientific article is the latest prose work of the Macedonian writer Violeta Tancheva-Zlateva, titled unusually "Bella sama". The novel follows the family history of the adolescent Bella, from the moment before her birth, up to her enrollment in college. The article examines the mother-daughter relationship, through Maria Lena's relationship with her aunt, as a surrogate mother figure, then the relationship between Maria Lena and her daughter Bella. In the article, great attention is paid to the meaning of this relationship, in order to highlight its importance in the development of a young person. Accordingly, the article discusses the impact of the loss/death of the mother on the adolescent Bella, the way she copes with grief, but also how she manages to continue fighting in life on her own.

Key words: adolescence, death, mother-daughter/child relationship.

INTRODUCTION

There are authors who amaze the readers with each of their works. One such author is Violeta Tancheva – Zlateva[1]. The last prose work of Violeta Tancheva - Zlateva, entitled

[1] Violeta Tancheva-Zlateva was born on April 25, 1968, in the village of Borievo, Strumica. She completed her primary education in her hometown and in the neighboring village. Turnovo, and secondary education at the "Jane Sandanski" high school in Strumica. In 1991, she graduated from the Faculty of Philology in Skopje, from the group of Yugoslav literature with the Macedonian language. From 1994 to 2013, she worked at TNID "Gjurdja", Skopje, at first as an editor of the magazines "Dopri me nežno" and "World Press IZBOR", later as chief and responsible editor of the publishing activity, responsible editor and proofreader. Since October 2013, she has been working as a proofreader at the TRI Publishing Center in Skopje. She has been a member of the Society of Writers of Macedonia since 2000. She is a member of the Editorial Board of the magazine for literature and culture AKT, of the magazine "Stožer", a newsletter of the Society of Writers of Macedonia, as well as of the Association of Readers of the Republic of Macedonia. Her literary work consists of the following works: Book of dreams, 1992; Returns, novel, 1993; Returning to Borievo, short stories, 1999; My Picasso/My Picasso, poetry with English overtones, Skopje, 2007; My Picasso/My Picasso, bilingual edition, sung in Bosnian, Banja Luka–Belgrade, 2008; Colorful letters, a novel for children in letters, 2008; Prisoners of silence,

"Bella sama" even with its unusual title will "tickle" our curiosity, and with its content it will shake our emotions. Or, as Lidija Dimkovska would say, "Bella Sama" is a poignant novel about growing up in which the polarization mother - daughter, niece - aunt, husband - brother, city - village, good - evil, child - adult, art - reality, love - hatred, body - soul, life - death is mirrored in an authentic way in the fate of Bella Samakoska, who during the transition from childhood to youth not only faces tragic family losses but also an attempt of abuse by a family member. Vulnerable and hurt, Bella finds the strength to live only in her own artistic talent that, nourished by the artistic heritage of her mother, shines like a firebird from the ashes of the present. The female principle in the story, torn between patriarchy and emancipation, is personal and collective. Bella Sama is also Bella and Sama, in fact, like so many other girls, women and women who pass by us with their burden that only our inner eyes can see. Violeta Tancheva-Zlateva in a warm humanistic way gives them the right to vote and thus offers us a reading for thinking, for remembering, for support and for action (Dimkovska 2024).

The riddle surrounding the title is revealed to us by the narrator - Bella himself in the Prologue of the book, with which he identifies himself: "I have a strange name... My mother once told me that I have one syllable from the grandmothers in it, so that both parties are satisfied." And I'm really white. Like the cheese of your grandmother Lazarica...And your eyebrows are like the blossoming sardines of your grandmother Bežanija" (Tanceva-Zlateva 2023, 7). Self-identification is not limited to naming: "My last name is Samakoska. Now, as I look back on the memories, I am most defined by his first two syllables: Sa-ma. Bella Sama" (Tanceva-Zlateva 2023, 7).

ABOUT THE NOVEL - ABOUT THE LOSS - ABOUT THE PAIN

The four-part compositional structure of the novel "Bella sama" by Violeta Tancheva-Zlateva reveals two different narrators. The first two chapters of the novel are dominated by the narration of Maria-Lena (Bella's mother), whose name also came about as a compromise to please both families. In the next two chapters of the novel, the narrator Bella "unravels" the events after the great tragedies in the family. One gets the impression that the first two parts are the history of Maria Lena's life, and the second two parts - of Bella.

The first part of the novel is an optimistic picture of the formation and consolidation of a new family, which at first consists of only Maria-Lena and her aunt Nevena. Nevena devoted her life to her family, after Maria Elena lost her parents at an early age: "She is now my mother and father. After dad and mom died almost one after the other, she came to my apartment, so that it would be more spacious for us, and she rented out his two-room apartment in the center to an accounting firm" (Tanceva-Zlateva 2023, 14). Thus, aunt Nevena becomes a maternal figure in Maria Lena's life, who remains to live with them (upon their persuasion) and after her marriage to Ilia/Ilko. It is the aunt, as a real mother, who will be the first person to invite Ilia to lunch after learning that he is the boyfriend of her beloved niece: "She used to make coffee for himself when he got up. Now she is waiting for us to leave the room, she wants us to drink it together and talk before everyone starts their day. Because now we are a family, a small community of three. A little strange, but functional" (Tanceva-Zlateva 2023, 14). This aunt-niece relationship is identical to the mother-daughter relationship, especially since Maria Lena herself says that her relationship with her mother was cold and distant. She realizes this especially when she gives birth to Bella and when she

poetry, 2010, Fire, poetry, 2011, Our story, poetry, 2013; Year without summer, poetry, 2015; The road, poetry, 2018; On the edge of the world, poetry, 2021; Time drips, poetry, 2021; Stories from the Last Century, a collection of short stories, 2022; Deaf time, poetry, 2023; Bella Sama, novel, 2023.

observes how her aunt behaves with her niece: "The two of us never got close. At one point, I just longed for her hug, for two or three warm words of understanding and love. But I didn't know how to trick her, much less how to tell her... I was angry with her then, but now I feel sorry for her... I never saw her relaxed or smiling, she was always in a fit, always leading account for something fearing that things may go in the wrong direction" (Tanceva-Zlateva 2023, 28). The parent-child relationship and its effects on the child have intrigued researchers because parents hold an important place in human life. In family life, the mother as the main caregiver has a more important role than the father in raising children. On the other hand, mother and daughters have a stronger attachment and greater intimacy than any other parent/child relationship. The importance of the mother-daughter relationship in the lives of both women, especially daughters, has been discussed for decades (Onaylı 2010). That relationship between adult daughters and their mothers often involves closeness, intimacy and support, that is, sharing a deep bond throughout their lifetime. According to Fisher (1991), interdependence and emotional connection in the mother-daughter relationship is much higher than in other dyads. This relationship is very important for a woman's self-definition. Therefore, this relationship must be positive (Fischer 1991, 237-248).

The newly created life in the family – Bella, complements the final picture from the first part of the book, with the vision of a happy family of four. In it, we follow the pregnancy of Maria-Lena, the birth of Bella and the new dynamics that she brings to family life, her growth, going to kindergarten, building a summer house in Ilko's native village, and especially Maria Lena's love for her child, for which Aunt Nevena sometimes knows how to reprimand her in a patriarchal spirit: "Love the child with your heart, not with words... You should not exaggerate anything, Lenche, not even in love. A person should have a measure in everything" (Tanceva-Zlateva 2023, 27).

Already in the second part of the novel, the narrator Maria Lena brings us a different picture, in which family happiness and harmony is past, and everything is a sign of the death of aunt Nevena: "Then the three of us remained, me, Ilko and Bella, dumbfounded by the emptiness of the apartment after her sudden departure. Now it's just the two of us, me and Bella. ...We are left without the fulcrum that maintains the balance of the home, of life, of the heart. We scatter like two specks of dust in the void, clinging to each other convulsively, fearing that we will be swallowed up by the giant space" (Tanceva-Zlateva 2023, 87). The death of the aunt, who leaves quietly and unobtrusively, is somehow acceptable, but the loss of the husband and father Ilko is something that turns the lives of Bella and her mother upside down. In that dark period, Sunday is only a day of the week when the resting place of loved ones is visited, as opposed to the previous period: "With freshly fried pancakes that fill the house with an intoxicating smell of vanilla, cinnamon and jam, mostly from strawberries and apricots. With hot cocoa in the cooler mornings. With cold lemonade in the middle of summer. I remember some other, happier weeks, when I was woken up in the morning by their mixed voices, their laughter, when dad often knew how to sing 'Your eyes, Leno mori, they are water cherries..." (Tanceva-Zlateva 2023, 88-89).

It is unfortunate that children will experience sadness in their lives. However, honest, specific and supportive conversations are very important for children's reactions and attitudes to grief and death. Children's books can provide a way to reach out and support children as they experience trauma and begin to understand the emotions surrounding their grief. It is important to understand the psychological process of grieving in order to help children understand death from an emotional point of view (Corr 2010, 1-20). The loss of Aunt Nevena does not seem to cause a greater emotional upheaval in Bella than in her mother. It is understandable, given Bella's age, but also the relationship between her mother (Maria -

Lena) and aunt Nevena. But the loss of the father means a lot to Bella. First, from an economic point of view, because she and her mother leave the city and move to her father's native village. Renting out the apartments in the city helps them to survive, because the mother does not have permanent employment. Children experience death in many ways—whether it's the loss of a family member, friend, or pet. Death has a huge impact on children and often causes what is called a 'grief reaction'.

Children's grief reactions, the way they react to the loss/death of a loved one/close person, depend on the socio-cultural context and individual development of the child. As a result, children demonstrate multidimensional ways of perceiving and responding to experience. When children are dealing with grief, they show complex emotions and feelings related to their personal identity, cultural background, and relationship with the loved one. They may show feelings of sadness, anxiety, and even show physical symptoms of anxiety, such as headaches: "I don't feel like going anywhere. Nothing is being done to me. I want to stay on the bench next to dad for a long time and remember the things we did together. If I close my eyes, I can hear his voice reading to me at night tucked under my little quilt with his legs poking out. And I like to imagine that the sun's rays caressing my face are his long, warm fingers" (Tanceva-Zlateva 2023, 90). As Corr points out, whether they are aware of it or not, parents and other caring adults serve as role models for children. When adults can express their own grief in the presence of their children and explain these reactions to their children, they contribute to their children's well-being. For example, it is normal for very young children to feel upset when a parent cries (Corr 2010). Therefore, a visit to the cemetery, for Bella and her mother, means only sitting on the bench, talking about the deceased father, taking care of the grave. The fact is that death cannot be hidden from children. A parent trying to shield a child from the experience of death only adds confusion and anxiety to an already difficult world. When there is a deceased person in the family, the feelings of the adult family members are transferred to the children in many non-verbal ways, such as facial expression, tone of voice, body posture, etc. (Vidal 1976, 175-184). Bella's pain is also evident at the moment when she reconsiders his senseless death, so she also has a feeling of anger towards the deceased: "I miss my dad a lot... He kept telling me to be careful where I'm going - I say with a tight throat. And why didn't he pay attention? - He slipped... - Mom is struggling. We always stick to that. He slipped... But why wasn't he careful not to slip? I am very angry with him, very!" (Tanceva-Zlateva 2023, 90). Kliman says that guilt, anger and anxiety are part of grieving, because children often feel a great deal of guilt and imagine that they may be somehow responsible for the death of a loved (Kliman 1968).

Thanks to her mother's down-to-earthness, Bella quickly adapts to her new life situation, continuing her life in the countryside. During that period, Maria-Lena pays a lot of attention to her daughter, she talks to her about the need to read books, they take action to clean up the waste in the village, and the conversation about the way of accepting and facing pain is particularly indicative: "Your pain Is your friend, Bella... And you should listen to her, because if you don't pay attention to things, if you don't take care of them, it can be really bad" (Tanceva-Zlateva 2023, 66-67).

As the end of elementary school approaches, Bella expresses her desire to continue her education in the city, at a secondary art school, as her mother once did. The joy of the mother, who will introduce Bella to the basics of art education through the analysis of her drawings, is evident, but in doing so, Bella is taken aback by what she will discover in the painting: "I stare at her, because if I blink, I'm afraid that the tears that have collected in my nose will flow... Such a heavy sadness comes over me that my breath is cut off. I can't seem to breathe. Is it possible that she is so dark inside, in her soul?" (Tanceva-Zlateva 2023, 105-106).

At the moment when the second tragic moment in Bella's life happens, the death of her mother from cancer, Bella is an adolescent. From the text in the novel, we learn that at that moment, she is fourteen years old, a semi-graduate, because she previously informed her mother that from next year she wants to continue her education at the secondary art school in the city. It places Bella within middle adolescence, when adolescents are already becoming aware of the physical, emotional, and cognitive changes that are occurring to them. As a reminder, the word "adolescence" comes from the Latin word "adolescere", which means "to mature". It is the life stage between childhood and adulthood. Adolescents are also called teenagers, and the period of adolescence is closely related to the teenage years (Kapur 2015, 233-250). Adolescents experience not only physical growth and changes, but also emotional, psychological, social and mental changes and growth. Adolescence can be broadly categorized into three stages – early adolescence (approximately age 11 to 13 years), middle adolescence (approximately age 14 to 17 years) and late adolescence (approximately age 17 to 19 years) (Salmela-Aro 2011, 360-368). One of the characteristics of middle adolescence is the search for one's own identity. Identity formation is a significant moment in this period, due to which adolescents may suffer from anxiety and mental disorders in the future. Adolescence is important for girls because of the special emotional, physical and cultural conditions and the role of the mother as the closest emotional person to her daughter. During this period, the mother informs her teenage daughter about the issues and problems of puberty, as well as about friendships. Given the importance of the mother's presence during this period, her death/loss is one of the greatest possible shocks during this period, which can have far-reaching effects on her (Shariatmadar and Taghdisi 2022, 166-202).

Bella loses her father at a young age and the presence of her mother during that period works as a kind of shock absorber so that she does not feel the loss to such a great extent. But with the loss of the mother, everything changes. As Davidman points out, children who have lost their mothers feel as if they have lost a secure foundation in their lives (Davidman 2000).

In her field research and articles on death and dying, psychologist Elizabeth Kubler-Ross identifies five stages of grief and loss: anger, grief, denial, self-doubt, and depression (Kubler-Ross 1969). Throughout the narrative, we see Bella faces all these stages, before accepting the new situation and moving forward. At first, she can't bear the sympathetic and pitying looks that people give her, so she wants to stay in the cemetery alone: "And I felt their pitiful looks clinging to my back. First light and somewhat soft, like a spring summer mist. Then more and more assertively....Go away, I wanted to tell her. Go away! You have completed your obligation and now you have a place to gather. You have each other to talk how beautiful the casket was, how dignified the funeral was and that there was food for everyone" (Tanceva-Zlateva 2023, 125-126).

Bella has a burning feeling of anger towards all living people, but also towards her deceased parents, so for those reasons she refuses to accept the finality of their death, which is why she does not want to go to the cemetery, according to tradition, forty days after death of the mother: "I locked myself in the bathroom and sat on the toilet seat for a long time, with my face buried in my hands. I expected to cry, scream, and shout angry questions... But I felt nothing. Nothing. Just a void, a huge hole in me. And just one big WHY that echoed off the stone walls of the void inside me. I sat for a long time and squeezed my chest, so that the abyss inside me would not suck me. The darkness behind my closed eyes. The ice inside me that had petrified all my senses...I could only smell it… the smell of dark incense and dry basil from the preacher's lamp" (Tanceva-Zlateva 2023, 130).

The refusal to accept the mother's death is evident in the moments when Bella remains living in her cold house, despite her aunt's efforts to move in with them: "I passed

my aunt's house. With a sideways glance, I saw the aunt standing at the window. But he didn't come out to call me. He didn't even wave at me. ...I came back to our house. The exceptional. More in the chest than in the legs" (Tanceva-Zlateva 2023, 133).

While the loss of either parent has lifelong consequences for most children, male or female, the psychological impact of her mother's death on a daughter's life and identity is unmatched by any other experience. Mother and daughter carry each other's identities and potentials both genetically and psychologically. Their relationship connects them to the cyclical and impermanent nature of life: a lineage of birth, death, and birth that stretches behind and before them. In other words, their relationship is a natural way of a mother seeing herself through her daughter's eyes, and a daughter seeing herself through her mother's eyes. When a mother dies in the life of a young daughter, the bond that was once created; now the daughter's sense of self is changed forever (Pascual 2014). Hence, refusing to accept the finality of death, Bella tries to relive the moments when her mother is still alive: "Only the door creaked when I entered the cold chamber. Ice. Silence. Darkness. Three words. Three abstract nouns with concrete meaning. Three things that start with the same letter as mom. They are the only ones left for" (Tanceva-Zlateva 2023, 134). But even though she returns home, the cold and empty house gives her no comfort. In her grief, she loses the will to live, constantly lies covered in the cold room, refuses to go to school and refuses to eat, because she feels guilty: "Aunty scolds me again for not eating, for bringing me food for nothing in her little pots with transparent lids. I take a bite and forcefully swallow it, along with the tears that collect in my throat and run down my nose and eyes. How can I eat, how can I talk, how can I wash, comb, dress, laugh... when mommy can't do any of that?" (Tanceva-Zlateva 2023:137-138).

Edelman writes that because girls love their mothers they want them to be flawless when they lived. Girls honor their mothers by giving them posthumous perfection and soothe themselves by creating mothers they wish they had. One of the key reasons why mothers cannot be replaced when they are gone is that there is confusion about who is being missed—the ideal mother or the real mother (Edelman 1995). And Bella idealizes her mother at certain moments and tries to bring her character closer, through the lessons she gave her: "My mother loved the lively, playful colors. All her scarves are overflowing in such bright joyful tones. What beautiful turbans she made with them!...With them she looked even taller, more beautiful" (Tanceva-Zlateva 2023, 145); "She was always honest with me, she didn't try to twist things, hide them from me. Even when she herself was ashamed of some of her former actions and words" (168); "Mom didn't like to keep a lot of things. She often cleaned, got rid of excess things" (Tanceva-Zlateva 2023, 170). There is general agreement that there is a certain set of emotions that tend to arise in children who experience the death of one of their parents. These reactions include unconscious and sometimes conscious denial of the reality of the parent's death; a screening of all affective reactions related to the death of a parent indicated a significant increase in identification with and idealization of the dead parent; decrease in self-esteem; feeling guilty; and persistent unconscious fantasies of a permanent relationship or reunion with the dead parent. These responses are thought to indicate an avoidance of accepting the death of the parent and the need to make a radical reorganization in the attributes given to the desired object (Miller 1971): "Today I decide to take all the books off the shelves. ...I wipe them one by one and arrange them on the table, on the bed, on the rug on the floor. I stare at their titles, caress them where mom used to touch them. I flip through them. I'm reading about a line. And I squint to remember the days when I listened to her frantically turn the rustling pages. All the books smell like you, Mom" (Tanceva-Zlateva 2023, 170).

CONCLUSION

The novel "Bella sama" by Violeta Tancheva-Zlateva is both a family novel and an adolescent novel, which, among other things, examines the mother-daughter relationship. This relationship was the subject of our interest in order to show its crucial importance in the development of the young person, and especially in the case when the young person loses that precious person from his life, how she copes with grief, where she finds the strength to continue with life. Although, no story should be expected to offer a complete philosophy, to depict all the stages of grief and to adhere to the "typical" set of circumstances. Literary characters can provide experiences and actions to guide readers toward empathy or model positive choices (Lovelace and Smith 2002). For those reasons, this book can be an extremely useful read for young adolescents in overcoming difficult situations in life and how to deal with negative emotions.

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Section A

INTERCULTURAL COMMUNICATIVE COMPETENCE: INSIGHTS INTO SOCIOLINGUISTIC, DISCOURSE AND STRATEGIC PROFICIENCY OF ESP STUDENTS

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Abstract

In this increasingly interconnected world, effective intercultural communication is vital for tackling diverse social and professional contexts. This study explores intercultural communicative competence (ICC), with a specific focus on examining sociolinguistic, discourse, and strategic abilities. Using a Google Forms questionnaire, data were gathered from 37 participants across various age groups (18-38 years). It included 37 ESP students from the Faculty of Biotechnical Sciences, at St. Kliment Ohridski University-Bitola, enrolled across various food technology undergraduate, master's and PhD programs. This sample was selected because it included current and potential future participants in student exchange programs (ERASMUS, CEEPUS), as well as foreign students studying at the faculty, making them particularly relevant for evaluating intercultural communicative competence. The analysis reveal certain perceptions into participants' capacities to adapt speech to different communication contexts, engage in conversations with individuals from diverse cultural backgrounds, and employ strategic communication strategies when faced with language barriers. This is a supplementary analysis and it provides an investigation of ICC, highlighting how sociolinguistic, discourse, and strategic competencies intersect. The findings point out both the strengths as well as the weaknesses of the participants' ICC, highlighting the need for acquisition of the aforesaid competencies for the efficient conduct of their intercultural communication endeavors, offering recommendations for educators and researchers to improve intercultural communication in the modern world.

Keywords: Intercultural communicative competence, strategic competence, discourse competence, sociolinguistic competence, cross-cultural communication.

INTRODUCTION

Effective communication across cultural boundaries has become essential for successful interactions in various social, academic, and professional contexts. Gudykunst and Kim (2003) emphasize that intercultural communication relies on adapting one's behavior to bridge cultural gaps effectively. Intercultural communicative competence (ICC) has emerged as a crucial element for understanding and enhancing individuals' abilities to engage in meaningful and effective communication with people from diverse cultural backgrounds (Byram, 1997; Byram & Risager, 1999). Spitzberg and Changnon (2009) conceptualize ICC as a dynamic process requiring the integration of knowledge, skills, and attitudes to handle cultural complexities effectively. ICC particularly incorporates a complex set of skills, knowledge, and attitudes that enable individuals to cope with intercultural encounters with sensitivity, flexibility, and adaptability (Deardorff, 2006). One key aspect of ICC is **sociolinguistic competence,** which refers to the ability to appropriately adjust one's language use based on the social and cultural norms of the communicative context (Savignon, 2001). This includes understanding and appropriately employing variations in speech styles, register, and politeness strategies across different cultural settings (Kramsch, 1998). **Discourse competence** is another fundamental component of ICC, focusing on individuals' ability to effectively structure and co-create meaning in interactions with speakers from diverse linguistic and cultural backgrounds (Canale & Swain, 1980). It involves not only linguistic proficiency but also an understanding of cultural norms leading conversational turn-taking, storytelling conventions, and pragmatic strategies for maintaining rapport and managing misunderstandings (Scollon & Scollon, 2001). **Strategic competence** completes the set of three ICC components, encompassing individuals' ability to employ communication strategies to overcome language and cultural barriers in intercultural interactions (Canale, 1983; Oxford, 1990). This includes tactics such as paraphrasing, clarification requests, and the use of compensatory strategies to convey meaning when faced with linguistic limitations or cultural misunderstandings (Oxford, 1990). While the concept of ICC has gained significant attention in the field of language education and intercultural communication, yet further exploration and empirical research into its various components still remain necessary. Exploring the aforementioned competencies, the author aims to gain a deeper comprehension of how students cope with cultural differences in communication and identify strategies for enhancing ICC development in educational and professional settings. To date, very little empirical attention has been given to ICC, with prior research primarily confined to surveys on the theories and definitions of ICC (Fantini, 2009; Lustig & Koester, 2010). However, decades of these types of investigations have only provided the initial insights into the nature of inter and cultural interactions, and despite an acknowledged need for more research that systematically looks at specific skills that make up ICC, the literature is still seriously lacking in this regard. The current study is a supplementary analysis and provides an exploration of ICC, highlighting how sociolinguistic, discourse, and sgrategic competences intersect. Thus, utilizing a structured questionnaire given through Google Forms, the author intends to find out about the participants' level of competencies in dealing with different aspects of intercultural communication. In line with the works of Byram (1997), Deardorff (2006), and Canale and Swain (1980), this study approaches ICC from a general perspective acknowledging the interdependency and interactivity of its constituent components in practical communicative events. By exploring all three competences collectively, the author seeks to provide a detailed understanding of how individuals handle cultural differences in communication and identify areas for intervention and improvement. It is important to highlight that the results of this study

are going to be beneficial for the improvement of theoretical and practical implementation in the fields of language education, intercultural communication training and cross cultural competency development. Thus, indicating the certain areas of strength and areas for improvement in participants' ICC, the author can point out to the possibility to use interventions aimed for promoting intercultural communicative competence in intercultural environment. Furthermore, the study seeks to establish the implications for intercultural communicative competence development and its impact on educational programs.

THEORETICAL BACKGROUND

Intercultural communicative competence (ICC) is a complex construct that has attracted attention in the fields of language education and intercultural communication. As Fantini (2009) noted, ICC plays a critical role in fostering effective intercultural communication. Following Byram's model of ICC (1997), this study emphasizes sociolinguistic, discourse, and strategic competence as core components. Byram (1997) defines ICC as the ability to interact effectively and appropriately with individuals from different cultural backgrounds, combining knowledge, skills, and attitudes. Deardorff (2006) further highlights the need for assessing ICC as a measurable outcome of international education, emphasizing its dynamic and iterative nature. Canale and Swain (1980) identify sociolinguistic and discourse competencies as critical for successful communication, while Oxford (1990) elaborates on the strategic use of communication tactics to overcome barriers. Previous studies have highlighted the importance of ICC in fostering effective intercultural interactions (Deardorff, 2006; Fantini, 2009). Additionally, Fantini (2006) emphasizes that ICC requires individuals to develop both linguistic and cultural adaptability to cope with diverse contexts effectively. Similarly, Bennett (1993) discusses how intercultural sensitivity is a developmental process essential to fostering effective communication across cultures. Moreover, Chen and Starosta (2000) highlight the importance of intercultural sensitivity and awareness as foundational elements of ICC, further underlining the interconnectedness of its components. Spitzberg and Changnon (2009) provide a comprehensive framework for conceptualizing ICC, which includes behavioral, cognitive, and affective dimensions. This framework complements Byram's model by emphasizing the integration of these dimensions in real-world intercultural interactions. Furthermore, Gudykunst and Kim (2003) focus on the role of cultural adaptation strategies in bridging communication gaps, providing valuable insights into strategic competence. However, a need for empirical research that explores specific competencies, particularly in student populations, to understand how these skills develop and manifest in real-world settings. This study aims to address this gap by examining ICC among students in higher education, providing a detailed understanding of their capabilities and areas for improvement.

METHODOLOGY

Research design and participants

This study is a supplementary analysis which seeks to establish the sociolinguistic, discourse, and strategic competence of the current undergraduate, master's and PhD students. To conduct this study, the research design was created based on Byram's model which emphasizes the key components of ICC: attitudes, knowledge, skills, and competencies, as essential for

effective intercultural communication. This model highlights the ability to interact effectively and appropriately with individuals from diverse cultural backgrounds. The structured questionnaire used in the study was developed by Zhong et al. (2013), a validated instrument specifically designed to assess ICC in higher education contexts. Its relevance for this study lies in its capacity to evaluate the competencies of the participants within an academic and intercultural framework. The aim of this study was to explore three specific aspects of participants' aspects of ICC. First, the study examined how students adapt their language use to align with various intercultural contexts, reflecting their sociolinguistic competence. Second, the research investigated students' ability to structure conversations and co-create meaning in interactions with individuals from diverse linguistic and cultural backgrounds, highlighting their discourse competence. Finally, the study assessed students' use of strategic communication techniques, such as paraphrasing and clarification requests, to overcome language and cultural challenges. The participants in this study were 37 higher education students enrolled in undergraduate, master's and PhD study programs, including Food and Dietetics, Food Quality and Safety, Agro-management, Zootechnique, and Food Technology and Safety, at the Faculty of Biotechnical Sciences at St. Kliment Ohridski University-Bitola. The participants were selected for their relevance to intercultural settings, given that many are current or potential participants in international exchange programs (e.g. ERASMUS, CEEPUS) or are foreign students. This diversity makes the group particularly suitable for evaluating ICC in a globally interconnected academic environment. Specific inclusion criteria included participants' affiliation as students of the Faculty of Biotechnical Sciences, thus, there were no restrictions as to the cycle or the study program. Additionally, the participants were required to demonstrate sufficient English proficiency, which was verified through their successful completion of the mandatory English for Biotechnology (B2-C1) course. English proficiency ensured that participants can fully engage with the ICC questionnaire, which was administered in English.

Instrumentation, data collection and analysis

The questionnaire used in this study is an adapted version of Zhong's ICC questionnaire, which is based on Byram's model of ICC. This validated instrument was specifically designed to measure sociolonguistic, discourse and strategic competencies in higher education contexts. The focus of this study is a supplementary analysis that exclusively examines these three ICC components, while other items in the questionnaire are the subject of separate research. Data collection was conducted via Google Forms, user-friendly and acceptable platforms for online surveys. The responses from the questionnaire are available at: file:///C:/Users/DELL/Downloads/Intercultural%20Communicative%20Competence%20Questionnaire%20-%20Google%20Forms%20(2).mhtml (question 23-37).The participants were informed about the voluntary and anonymous nature of their participation and their right to withdraw from the study at any time. No personal data was collected, ensuring the participants privacy throughout the process. The responses were analyzed quantitatively to identify general patterns in sociolinguistic, discourse and strategic competencies. This approach enabled the study to highlight key areas of strength and areas requiring improvement, providing actionable insights into the participants' intercultural communicative communication.

RESULTS

Sociolinguistic Competence

Adjusting Speech to Different Communication Situations: The majority of participants (48.6%), strongly agreed, and 21.6% agreed that they can adjust their ways of speaking according to different communication situations. This indicates a high level of sociolinguistic competence among the participants, as they demonstrate flexibility in adapting their language use to different contexts.

Adjusting Speech Based on the Age, Gender, Identity, Status, and Closeness to the Other Party: Participants generally demonstrated a high level of ability to adjust their speech based on various factors such as age, gender, identity, status, and closeness to the other party. The percentages for strongly agree and agree responses were consistently high across all items, ranging from 51.4% to 67.6%.

Table 1. Sociolinguistic competence

No.	Question Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
23	I can adjust my ways of speaking according to different communication situations.	10	18	8	1	0
24	I can adjust my ways of speaking based on the age of the other party.	12	14	9	2	0
25	I can adjust my ways of speaking according to the gender of the other party.	9	16	11	1	0
26	I can adjust my ways of speaking based on the identity and status of the other party.	9	16	10	2	0
27	I can adjust my ways of speaking based on how close I am to the other party.	10	12	14	1	0

Discourse Competence

Choosing the Right Topic: A majority of participants (56.8%), agreed that they can choose the right topic when communicating with people from different cultures. This indicates a adequate level of confidence in this aspect of discourse competence. However, with 21.6% expressing neutrality and a small percentage disagreeing (2.7%), there is still room for further development to ensure that all participants feel confident in their ability to select culturally appropriate topics in conversations. **Continuing the Conversation Smoothly:** The majority of participants (45.9%), agreed that they are able to continue the conversation smoothly when communicating with people from different cultures. However, a significant proportion (27%) indicated neutrality on this item, indicating some variability in participants' confidence in maintaining smooth conversations across cultural boundaries.

Starting and Ending Conversations Appropriately: A substantial number of participants (43.2%) agreed that they were able to start and end conversations appropriately and naturally when communicating with people from different cultures. However, similar to the previous item, a notable percentage (27%) indicated neutrality, suggesting room for improvement in this aspect of discourse competence.

Table 2. Discourse competence

No.	Question Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
28	I can choose the right topic when communicating with people from different cultures.	7	21	8	1	0
29	I am able to continue the conversation smoothly when communicating with people from different cultures.	10	17	8	2	0
30	When communicating with people from different cultures, I was able to start and end conversations appropriately and naturally.	9	16	10	2	0

Strategic Competence

I will keep silent when I encounter something I cannot express in English: A majority of participants (59.5%) either agreed or strongly agreed that they would keep silent when encountering something they cannot express in English. This indicates a tendency among participants to refrain from speaking when faced with linguistic challenges, potentially affecting their strategic competence in intercultural communication.

Avoiding Topics Unable to Express Ideas: A significant number of participants (45.9%), strongly agreed or agreed that they would avoid topics in which they are not able to express their ideas. This suggests a potential limitation in participants' strategic competence, as they may avoid engaging in certain conversations due to perceived language barriers.

Using Communication Strategies for Overcoming Difficulties: The majority of responses indicated agreement with statements related to using strategies such as choosing synonyms for unfamiliar words (56.7% agreed or strongly agreed), expressing confidence in using longer sentences to explain concepts (56.7% agreed or strongly agreed), using conversation fillers to buy time (51.3% agreed or strongly agreed), and actively employing clarification and repetition strategies (67.5% agreed or strongly agreed). Therefore, the participants generally demonstrated a high level of strategic competence in employing communication strategies to overcome difficulties in intercultural communication.

Table 3. Strategic competence

No.	Question Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
31	I will keep silent when I encounter something I cannot express in English.	4	9	12	10	2
32	I will avoid the topic in which I am not able to express my ideas.	4	13	9	8	3
33	When I encounter words that I cannot remember, I will choose other	15	16	5	1	0

	words with similar meanings instead.					
34	When I encounter something that cannot be expressed in a word, I will use a long sentence to explain it.	14	16	5	2	0
35	I will use conversation fillers such as "er" or "well" to win time for thinking.	5	17	14	1	0
36	When I encounter communication difficulties, I will ask the other party to repeat or reorganize the language.	8	17	9	3	0

Based on the results presented in the tables, we can address the research questions and draw conclusions as follows:

The outcomes of the study that concern the level of **sociolinguistic competence of students of Biotechnical Sciences** suggest that most of the participants possess a high level of sociolinguistic competence. They were confident about their ability to regulate the communicative means to the communication context and to the relational variables of age, gender, identity, power, and closeness of the co-participants. This suggests that participants possess the ability to adapt their language use to various social and cultural contexts, which is essential for effective intercultural communication. Regarding the extent of the **discourse competence in intercultural communication of the students at the Faculty of Biotechnical Sciences**, the findings reveal variability in participants' levels. A sizable number of participants were neutral regarding their ability to pick a suitable topic when interacting with individuals from other cultures, and to maintain the conversation without encountering any complications. This points to the idea that while some of the participants may be self-assured in their ability to engage in intercultural communication, others may define obstacles when it comes to choosing what kind of topic and how to communicate seamlessly across cultures. In as far as the use of **communication strategies as a way of handling possible intercultural communication barriers**, the participants reported moderate to high strategic focus. They explained the strategies like replacing certain word; speaking more formally; using the extra 'thinking words' which help gain thinking time. However, some of the participants also noted tendency to avoid certain topics where they felt less prepared to contribute. This suggests that while they employ strategies effectively in many contexts, additional support may help build their confidence to engage fully across a wide range of topics.

DISCUSSION

While the findings of this study provide valuable insights into the sociolinguistic, discourse, and strategic competence of higher education students regarding the intercultural communication, it is important to acknowledge the broader implications of these findings. One of the specific implications is the social aspect or the awareness of sociolinguistic differences in relation to different cultures. With regard to these findings, it can be stated that intercultural competence is valuable in interpersonal communication since it encompasses individuals'

capacity to vary language when interacting with different cultures and communities. In addition, the findings also contributed to the existing knowledge of the nature of discourse competence in intercultural communication. Although there were several participants who displayed clear competence in engaging at the pragmatic level of structuring communication and co-constructing context across cultures, there were those who reported either marginal or mixed competence when it came to the selection of topics to discuss or the interpersonal management of communication. This implies that the discourse competence is influenced by multiple factors across contexts, highlighting the importance of providing students with structured opportunities for explicit instructions and practical engagement in intercultural communication. Thus, by nurturing students' discourse competence, instructors can assist them in assuming more competent positions in dealing with interlocutors from a different culture in communication. Also, the impact of strategic competence in mediating linguistic factors and soft power in the field of intercultural communication is also discussed in the study. Even though participants demonstrated a strong tendency to employ communication strategies such as paraphrasing and clarification requests, some indicated a tendency to remain silent or avoid topics in which they felt linguistically challenged. While many actively utilized these strategies, others expressed hesitation, often avoiding topics they felt less prepared to discuss. This tendency should not necessarily be viewed as a weakness but rather as an opportunity for growth, highlighting the need for targeted training that equips students with the confidence and tools to engage more seriously across various intercultural scenarios.

LIMITATIONS

This study has several limitations that may impact the generalizability and scope of its findings. To begin with, the relatively small sample size (37 participants) may limit the applicability of the results to a broader population. Future studies with larger and more diverse sample sizes are needed to enhance generalizability. Second, the use of self-reported measures in the form of questionnaires introduces may introduce some subjectivity, as participants might provide responses they perceive as favorable rather than fully reflective of their actual competencies. To enhance data reliability in future research, it would be beneficial to integrate some interviews as well. Third, this study was limited to students enrolled at the Faculty of Biotechnical Studies at UKLO- Bitola, North Macedonia. Consequently, the findings may not be directly applicable to students from other academic disciplines or professional contexts. Comparative studies across other faculties or institutions could yield a broader understanding of ICC. Finally, the study focused exclusively on three components of ICC- strategic, discourse and sociolinguistic competencies. Other critical aspects in the scope of the ICC such as intercultural knowledge, skills, awareness and attitudes are a subject of separate study. This supplementary nature of the study narrows its range but provides valuable insights into specific competencies.

FUTURE RESEARCH DIRECTIONS

Further on, it's of an utmost importance to expand on the results of this study and analyze more aspects of intercultural communicative competence. Investigating the personality traits or cultural backgrounds when shaping the individuals' ICC, is the very first option. Having the opportunity to examine how individual differences interact with sociolinguistic, discourse, and

strategic competence, researchers can gain knowledge about the factors that contribute to effective intercultural communication. Additionally, exploring the transferability of ICC across different contexts and cultures would be valuable. Cross-cultural comparisons could shed light on how individuals' ICC evolves over time and adapts to changing socio-cultural contexts, offering important insights into the three competencies within ICC among young adults. To address these implications, the following activities may be considered as practical and necessary. Implementing role-playing scenarios or case studies that encourage students to adapt their communication to various conversational settings, including age, gender, and power dynamics, to strengthen the sociolinguistic competence. To enhance the discourse competence, educators may consider developing workshops focused on topic selection and conversation management, emphasizing conversational flow and addressing misunderstandings in intercultural contexts. Finally, to improve strategic competence, practical training in paraphrasing, using conversation fillers, and employing clarification requests through real-world or simulated intercultural communication practice, should be encouraged. By addressing these future research directions, this study offers a pathway for developing more inclusive and culturally responsive communication practices.

CONCLUSION

Conclusively, this study provides an examination of sociolinguistic, discourse, and strategic competence within the context of intercultural communication. Analyzing participants' responses, the author provided valuable insights into their abilities to handle the cultural differences in communication and implement effective communication strategies. Considering the implications and future research directions outlined in the discussion, the author and the readers can continue to advance the understanding of ICC and contribute to the development of more inclusive and culturally responsive communication practices in educational and professional settings.

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Section A

OPTIMIZING EFL INSTRUCTION FOR BILINGUAL LEARNERS IN NORTH MACEDONIA

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Abstract

More and more children nowadays are exposed to content in English from an early age. They acquire English alongside their native Macedonian and, as a result, speak the foreign language fluently before they even begin attending school. Thus, EFL teachers in North Macedonia regularly encounter students with exceptional English proficiency who use the language as a native tongue rather than a foreign language. The number of such children is high and ever-growing. Understanding this, this study addresses the perceived lack of a suitable curriculum for these advanced learners. We aim to bridge the gap between their language abilities and standard English instruction by developing a program for fourth-grade bilingual students. To understand students' needs, benefits, and challenges comprehensively, we incorporated teacher feedback via a survey into the process. Our findings indicated that many bilingual students seem to be under-challenged in traditional English classes. Despite administrative hurdles and potential motivational issues, our findings suggest that tailored instruction would yield many advantages for bilingual students in North Macedonia.

Keywords: Bilingualism, English Language Teaching, Primary Education, EFL, Curriculum Development.

INTRODUCTION

Although bilingualism is a centuries-old phenomenon, modern bilingualism, supported by technology, is now gaining momentum. As a result, more and more children are fluent in

another, foreign languages from an early age. The abundance of foreign-language-speaking videos aimed at children, along with video games that increasingly play a role in the daily lives of the younger generation, provide a great foundation for learning a foreign language implicitly alongside children's native tongue.

According to the latest data from Statista, in November 2022 alone, three of the six most-watched YouTube channels globally were children's channels, with videos collectively viewed nearly 9.5 billion times. There's no doubt that children today are growing up with Cocomelon, Wow Kids, and the new short reels on TikTok. All in English. It's no surprise, then, that teachers witness a daily increase in the number of bilingual children in their classrooms.

Despite the growing number of bilingual children, however, the English language curriculum for EFL (English as a Foreign Language) in primary education does not account for these children's unusually high language competencies. These students, who speak English at the level of their native Macedonian, spend years learning basic vocabulary about colors, body parts, food, and animals—vocabulary they've long since mastered and can use proficiently in complex sentences and longer discourse.

The so-called, additional instruction, which could be the solution to this issue, primarily focuses on the standards and criteria set out in the annual, Ministry-approved curriculum—a program that fails to sufficiently challenge this group of students. Furthermore, additional instruction is typically offered to students who excel at the level *expected* for their age. These students are not always bilingual, who are particularly talented and use the language at a level comparable to children of the same age in countries where English is spoken as a native language.

This mismatch between the EFL curriculum and the needs of bilingual students is the starting point for this paper. By introducing a new, annual program/curriculum for fourth-grade bilingual students and conducting a survey with the potential teachers involved, this study attempts to show that bilingual students in the EFL classroom can indeed thrive—but only if the curriculum is adapted to their unique educational needs.

BROADER CONTEXT

Bilingualism: Basic Notions

The need to know and communicate proficiently in multiple languages is centuries old. Hoffman (1991) notes that since ancient times, people have had to learn the languages of their neighbors to communicate with them and trade. Bilingualism, therefore, is a concept with a long-standing history.

With over 5,000 languages and only 195 countries (Crystal 2000), the world's linguistic diversity, combined with the multicultural nature of today's societies, has resulted in a growing number of individuals who can smoothly communicate in multiple languages. Hoffman adds that a number of countries are even statutorily bilingual. In Europe, for instance, Belgium, Finland, Switzerland, and Ireland are either bilingual or multilingual. Similarly, the former Yugoslavia was, as Hoffman notes, officially a state of bilingual and multilingual Yugoslavs.

According to Hoffman, while there are countries where bilingualism is statutory, many bilinguals are from the minority groups within a society and learn the languages they speak

implicitly, at the same time, but in different social contexts. For instance, one language is used at home, and another in school.

Bilingualism is now the global norlm. Even countries that were once predominantly monolingual are now home to many bilinguals. The European Commission's 2006 survey revealed that 56% of EU citizens are at least bilingual, with 28% speaking three languages. Even the United Kingdom—traditionally perceived as monolingual—reported 38% of its population as bilingual. Bilingualism, of course, extends beyond Europe—in countries like Canada, South Africa, and the Philippines, it is a fundamental part of the national identity (Grosjean 2012). In fact, monolinguals are now a minority worldwide (Ortega 2009).

Hamers and Blanc (1989) define bilingualism as the result of contact between multiple languages within a society at an individual level. They state that bilingualism is inherently linked to human experience, particularly in our increasingly interconnected world shaped by globalization, tourism, and language learning.

While the definition of bilingualism varies, for the purposes of this paper we, the authors, have formulated the following working definition: "*bilinguals are individuals with a high degree of proficiency in two languages, demonstrated by their capacity to use both languages fluently in communication"* .

Types of Bilingualism

According to D'Acierno (1990), there are three basic types of bilingualism: compound, coordinate, and sub-coordinate. Compound bilingualism develops when both languages are learned simultaneously in the same environment from an early age. In this case, a child growing up with two languages implicitly understands that there are two lexical units for the same concept a.k.a. two words for one thing. Coordinative bilingualism, however, develops in distinct contexts. For example, one language might be learned and used at home, while the other is acquired and used at school. In the so-called sub-coordinate bilingualism, one language is dominant, meaning the speaker is more proficient in one language and uses it to interpret the other. All these types, according to D'Acierno, refer to spontaneous, implicit language acquisition early in life.

Li (2000), on the other hand, proposes a different classification. He distinguishes between:

- Simultaneous bilingualism, where both languages are learned at the same time;
- Early bilingualism, where both languages are learned in childhood;
- Late bilingualism, where the second language is acquired later in life; and,
- Passive bilingualism, where a person understands the language in written or spoken form but cannot speak or write it independently.

Yet, according to many theorists, the only "true" bilinguals are the children who, as early bilinguals, grow up exposed to both languages and use them at home, from a young age. These children develop their linguistic competences in both languages and can switch between them effortlessly when communicating with others (Baker, 2014).

Whichever way they are classified, one thing is for sure: the number of bilingual children is steadily increasing. However, Garcia and Li (2014) argue that although the number of bilingual children and students is on the rise, education systems still fail to adapt to their needs,

often prioritizing monolingualism. A similar thing happens in North Macedonia, where bilingual students who speak both English and Macedonian fluently, are taught and assessed using the same curriculum and educational standards as students learning English as a foreign language, who naturally have lower language proficiency. Their advanced linguistic abilities are thus disregarded.

The only attempt at a bilingual Macedonian-English curriculum within the educational system of North Macedonia is currently implemented through the so-called bilingual classes/programs offered in a few state and private high schools across the country. One such school is the high school of "Taki Daskalot" in Bitola, where a Macedonian-English bilingual program has been running successfully for a few years.

In addition to Macedonian-English programs, some high schools also offer Macedonian-French programs, which, naturally, follow a separate curriculum. No bilingual Macedonian-Education curriculum is available for primary schools in North Macedonia, as of yet.

RESEARCH METHODOLOGY

This research addresses the issue of a growing number of bilingual students in English classes in North Macedonia – students who lack motivation and are underchallenged in the traditional EFL instruction. It focuses on students in primary schools who speak both English and Macedonian at near-native levels and it examines the misalignment of the current curriculum with their needs.

The research aims to modernize the teaching process to better serve bilingual students by proposing a new program/curriculum tailored to their language level. It also seeks to determine whether teachers find this program applicable. The study combines qualitative and quantitative methods (Brewer & Hunter 1989; Nunan, 1992).

The research focuses on primary school students and teachers. To gain insights into EFL teachers' attitudes, a purposive sample of six EFL teachers teaching fourth grade was selected.
The research procedure, following the procedure steps proposed by Pandey (2015,13), involved:

- Analyzing the current EFL curriculum for fourth grade;
- Developing a new curriculum for bilingual students;
- Distributing it to teachers for feedback;
- Surveying teachers;
- Analyzing the survey results;
- Reporting the results.

The research hypothesizes that *"Many bilingual students in primary education find regular classes insufficiently challenging"* and suggests the need for a separate English program for these students, which teachers recognize as necessary.

Limitations

The study is limited to fourth-grade students and a small sample of teachers from Bitola, North Macedonia. Despite these limitations, however, we believe the insights it provides are valuable.

Ethics

This research adhered to strict ethical guidelines. Participants were informed of the researchers' identity and the study's purpose. Anonymity was ensured through the use of anonymous questionnaires, and all personal data were protected. In addition, proper citation practices were followed to maintain academic integrity.

Conflict of interest
The authors declare no conflict of interest that could obstruct the objectivity of this study.

RESULTS AND DISCUSSION

Basic information about the proposed curriculum
Subject: English Language
Student Group Size: Group sizes will be determined based on testing results, with a maximum of 30 students per group. Smaller groups may be formed to improve teaching effectiveness.
Time Frame:

- **September**: Students will be tested using the official Cambridge English test for young learners, then, an analysis will be conducted and students will be organized into groups..
- **October to December and February to May**: Weekly one-class meetings will be held.
- **June**: A student survey will be administered to gather feedback on the curriculum and the implemented activities.

Goals
This program aims to improve bilingual students' language skills and motivation by offering activities tailored to their proficiency.

Learning Outcomes
Expected outcomes include:

- Improved vocabulary;
- Higher motivation;
- Better grammatical accuracy in speaking and writing;
- Greater engagement in discussions;
- Improved teamwork;
- Increased interest in creative writing and the cultures of the English-speaking countries.

Student progress will be tracked through checklists, portfolios, and written feedback. Attendance and participation will also be recorded.

Implementation
The curriculum comprises 27 classes, each lasting 40 minutes, scheduled as extracurricular activities/classes.
Resources Needed

Digital materials (e-books, presentations, videos), smart board, computer, worksheets, whiteboard, and VR glasses.

4.2. Curriculum Overview

Lesson Topic	Activities Planned	Time frame
Introduction to Content and Goals	Students will participate in icebreaker games like "Would you rather...?" to practice English speaking and engage in team activities designed to help them get to know each other and discuss the program's goals.	October
Book Study: "Town Mouse and Country Mouse"	The lesson will begin with an introduction to the topic, followed by a vocabulary quiz, reading session, and a discussion of the characters and plot. Students will then try to link what was covered here with the material in their Macedonian language curriculum	October
A Typical School Day Around the World	Students will discuss their daily routines, watch the video "Day in the Life: An Elementary School Student," and then work in groups to compare the school system in North Macedonia with the one shown in the video.	October
Fun Math in English: Rounding Numbers	This session will mirror content from the math curriculum, where students will review key terms in English, practice rounding exercises, and complete worksheets for additional vocabulary practice.	October
"Things I Wish My Parents Understood Better..." - Children's Month Activities	In this activity, students will create infographics in groups about issues they wish adults understood better, followed by presentations and class discussions.	November
Book Study: "Benji, The Bad Day, and Me"	Students will explore different types of disabilities through discussions, watch and listen to a story, and analyze the characters' emotions. They will also participate in a vocabulary quiz using Kahoot.	November
Kids as DJs: Learning Through Music	The class will listen to students' favorite English songs, discuss unfamiliar words, and engage in group games to identify songs by their opening tones and lyrics.	November
Listening Comprehension: Fill in the Blanks	Students will engage in a brief discussion of the text before the initial listening. During a second, repeated listening, they will complete fill-in-the-blank exercises, followed by self-assessment and a discussion of comprehension challenges.	November
Creative Writing: Sentence by Sentence	In this collaborative activity, students will write a story together, with each student contributing one sentence. Afterward, they will read the story aloud and discuss its cohesion, verb tense usage, and spelling accuracy.	December
Christmas Around the World	Students will watch a video about Christmas traditions from around the globe, then discuss the similarities and differences with their local customs. They will brainstorm ideas based on the theme, "For Christmas, we...".	December
Book Study: "That's Not My Name"	This session will focus on exploring different nationalities through the story "That's Not My Name." Students will watch and listen to the story, then engage in activities to analyze characters' emotions and reactions.	December
Creative Writing: If I Ruled the World	Students will begin by listing five changes they would make if they ruled the world. They will then pair up to agree on three priorities, followed by presentations and discussions.	February
Listening Comprehension: Valentine's Day	This lesson will start with a discussion about Valentine's Day, followed by listening exercises. Students will engage in repeated listening with fill-in-the-blank activities, self-assessment, and a discussion of comprehension challenges.	February
Science Lesson: The Water Cycle	Based on a U.S. science textbook, this lesson will cover key terms related to the water cycle. Students will compare these terms with their Macedonian equivalents and take a vocabulary quiz using Kahoot.	February

Book Study: "Clever Rabbit and the Wolves"	Students will be introduced to the topic with a vocabulary quiz, followed by reading the book and discussing the characters and plot. The session will also connect the story with the Macedonian language curriculum and the contents covered in those classes.	February
Language Games: Synonyms and Antonyms	Using a U.S. workbook as a guide, this lesson will involve discussions on synonyms and antonyms, group activities, and practical exercises.	March
Writing: Everyday Superheroes	Students will discuss superheroes and the heroic deeds of ordinary people. They will then write a short text about "An Everyday Superhero" and present their writings to the class.	March
Grammar Through Games	In this session, students will review present tense grammar structures through a series of educational games, aligned with the fourth-grade English curriculum	March
Virtual Tour of U.S. and U.K. Cities	Students will use VR to explore major cities in English-speaking countries. After the tour, they will describe the city they "visited" for their classmates to guess.	March
Easter Around the World	This lesson will involve watching a video about Easter traditions around the world, followed by a discussion of the similarities and differences with local customs. Students will brainstorm ideas based on the theme, "For Easter, we...".	April
Speaking Game: Taboo	In this group game, students will use pre-made cards to describe a key word without using "taboo" words while their teammates guess the word. Keywords will focus on advanced vocabulary.	April
Book Study: "Trapped"	Students will be introduced to the topic with a vocabulary quiz, then read the book, discuss the characters and plot, and connect the contents of the story to the Macedonian language curriculum and what they have already been taught.	April
Listening and Discussion: Peer Bullying	The session will start with a brainstorming activity on "What is peer bullying?" followed by watching a video on the topic. Students will then discuss strategies for dealing with bullying and where to seek help.	April
Story Retelling	Students will listen to a short story, discuss its characters and themes, and then retell the story using puppets for a puppet theater-style performance.	May
Creative Writing: Finish the Story	In this activity, students will read a story introduction, discuss the characters and key terms, and then work in pairs to write story continuations. They will share their endings and compare them to the original story.	May
Language Games: Homophones and Homographs	This lesson, based on a U.S. workbook, will include discussions on homophones and homographs, group work, and practical exercises.	May
Spelling Bee Competition	Students will review and practice the vocabulary they've learned through a spelling competition. The winner will receive a prize, and students will complete a survey to provide feedback.	May

This curriculum was shared with six English teachers (N=6) – teachers currently teaching or have previously taught fourth grade. The teachers were then asked to complete an electronic questionnaire regarding the curriculum.

Survey Results

To gather insights from the English teachers directly involved in fourth-grade instruction, a brief electronic survey was distributed to six teachers from two primary schools in Bitola, North Macedonia. The survey aimed to collect quantitative data on the effectiveness of the proposed bilingual curriculum, its potential benefits and challenges, and the number of bilingual students these teachers work with daily. The questionnaire was open in January, 2024. While most questions were closed-ended, teachers had the option to add additional comments.

Bilingual Student Proficiency

Two-thirds (4 out of 6) of the surveyed teachers reported that more than 30% of their students speak English at a level comparable to their native language. The remaining teachers (2 out of 6) indicated that 20-30% of their students could be considered fully bilingual.

Suitability of the Current English Curriculum

Every respondent agreed that the existing English curriculum does not sufficiently challenge bilingual students, showing the need for a more advanced program tailored to their abilities.

Evaluation of the Proposed Curriculum

Teachers were asked to rate the proposed curriculum on a scale of 1 to 10. Four teachers awarded it the highest score of 10, while the remaining two rated it a 9, demonstrating strong approval of the curriculum.

Potential Benefits

Teachers identified several potential benefits of implementing the proposed curriculum. All six agreed that it would boost student motivation and engagement. Additionally, 83.3% (5 out of 6) believed it would enhance language skills and encourage creativity. Half of the teachers also felt it would increase students' interest in the cultures of English-speaking countries.

Challenges and Obstacles

The most commonly cited challenges were a potential lack of teacher interest and the increased administrative workload that the curriculum's implementation might require. Two-thirds (4 out of 6) also mentioned a lack of technical resources as a significant barrier. Other concerns included student disinterest, limited space in schools, and the worry that students already have too many things to do.

CONCLUSION

Bilingualism is increasingly becoming a part of everyday life in education, and it's only going to grow. With more and more bilingual students, driven by technology and modern media, there's a clear need for a more advanced and customized approach to teaching English in North Macedonia.

Teachers have pointed out that the current English curriculum isn't challenging enough for bilingual students, leading to stagnation instead of progress. In some classes, over 30% of the students are bilingual, making it evident that the existing curriculum falls short of meeting their needs.

This study introduces a new curriculum aimed at boosting motivation, sparking creativity, and improving all language skills—speaking, writing, listening, and reading. Teachers who reviewed the proposed curriculum gave it high marks, noting that it would help bilingual fourth-grade students learn at a level on par with their peers in English-speaking countries. While

there might be challenges in rolling out this curriculum, the benefits for students far outweigh the effort. After all, the ultimate goal of education is to meet the needs of every student, and this curriculum is a step toward achieving that.

Further research could explore the long-term impact of such a tailored bilingual curriculum on students' language proficiency and overall performance not just in primary school (grades 1 to 5), but in middle school (grades 6 to 9) as well.

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Section A

A COMPARATIVE ANALYSIS OF FIRST-PERSON PRONOUN USE IN AI AND HUMAN ESSAYS

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Abstract

This study comparatively analyzed the use of the personal pronoun "I" in AI-generated and human-written essays through an AntConc analysis of two self-made corpora of texts, to (dis)prove the hypothesis: AI-generated essays will use the first-person pronoun "I" significantly less frequently than human-written essays. The first corpus of essays in this study, all generated by ChatGPT, consisted of 100 essays totaling 29,442 words. The second corpus of 100 essays, written by humans, included texts with a total word count of 39,878. The frequency analysis revealed a significant disparity in the use of the pronoun "I" between the two corpora. In the AI-generated essays, "I" was used only 15 times, contrasting sharply with the human-written essays, where "I" appeared a total of 523 times. These findings showed the noteworthy differences in the narrative styles of AI and human writers, showing the potential limitations of free Generative AI models in replicating human-like self-reference and subjectivity in written discourse.

Keywords: Artificial Intelligence, ChatGPT, Academic Writing, Corpus Linguistics, Discourse analysis.

INTRODUCTION

In recent years, the development and use of artificial intelligence (AI) in generating written content has skyrocketed. And not just in the academic community, but worldwide, in general. Generative AI (GenAI) models, like OpenAI's ChatGPT, have been at the forefront of this AI-revolution.

GenAI is a branch of AI designed to create new content based on human instructions, utilizing the training data it has been exposed to. These models are specifically trained and programmed to generate original content—whether it be text, images, music, video, or other forms—that did not exist before (Singh 2023).

GenAI models nowadays are used in various areas, including education, content creation, and even automated customer service. They have been rapidly advancing and producing more and more content that is sometimes hard to distinguish from human-produces one. However, despite all of the advancements GenAI and natural language processing (NLP), questions remain about the extent to which AI can replicate human-like writing.

AI writing has been extensively studied in the past two to three years (Dillon et al. 2022; Fitria 2023; Mahama et al. 2023; Herbold et al. 2023; Shalevska 2023; Shalevska 2024 etc.) yet, one aspect the AI-produced texts – the use of the first-person pronoun "I" – has been under-researched.

The use of "I" in writing is more than just a grammatical choice; it reflects the writer's involvement, perspective, and subjectivity. In academic discourse, the use of "I" can be contentious, as it introduces a personal element that some scholars argue is at odds with the objective tone of scholarly writing. Others, however, assert that the strategic use of first-person pronouns can enhance clarity and reader engagement (Thonney 2013; Webb 2024).

This study aims to explore the differences in the use of the first-person pronoun "I" between AI-generated and human-written essays. By analyzing two corpora—one composed of essays generated by ChatGPT-3.5 and the other by human writers—this study seeks to shed light on how AI models approach personal engagement in text and how this compares to human writing.

Broader Context

The role of the first-person pronoun in academic writing has been the subject of significant research. The use of the pronoun is linked with self-references which can serve multiple purposes, including structuring the text, guiding the reader, and acknowledging funding sources (Chavez Munoz 2013).

In terms of self-reference and author visibility, Hyland (2002) asserts that the use of the first-person pronoun can increase the visibility of the author, thereby strengthening the argument being presented. Hyland also identifies different functions of personal pronouns in academic texts, such as: stating a purpose, explaining a procedure, stating results/claims, expressing self-benefits, elaborating an argument and giving acknowledgements.

Regardless of its function, Chung and Pennebaker (2007) argue that the use of "I" often reflects personal involvement and emotional intensity. Their research shows that this pronoun is frequently used in intimate and personal texts. Popescu (2007), similarly to Tang and John (1999), notes that in student essays, the first-person pronoun "I" is among the most frequently used words. Tang and John (1999) also find that the use of first-person pronouns can serve multiple functions, including expressing personal involvement, structuring arguments, and clarifying the writer's stance. Their study suggests that while first-person pronouns are often discouraged in academic writing, they can be strategically employed to enhance clarity and reader engagement.

Tang and John (1999) also propose a spectrum of authorial presence conveyed by the personal pronoun “I”, ranging from minimal to maximal authorial presence. The roles within this spectrum, from least-powerful to most-powerful authorial presence are: 1. “I” as representative; 2. “I” as the guide; 3. “I” as the architect; 4.“I” as the recounter of the research processes; 5. “I” as the opinion holder and 6. “I” as the originator, with “I” referring to all forms of both the first and second person singular and plural forms.

In an interesting comparison to do with the use of “I”, Newman et al. (2008) indicate that women tend to use the first-person pronoun more often than men, suggesting possible gender differences in writing styles. Regardless of the gender, Tausczik and Pennebaker (2010) analyze the psychological significance of words, revealing that frequent use of personal pronouns like "I" is associated with more intimate and personal texts.

In a different context, Harwood (2007) finds that even politicians use first-person pronouns to make their statements sound more convincing. This widespread usage underscores the pronoun's importance in various forms of communication, including academic and political discourse.

Despite the extensive research on first-person pronoun use in human writing, there has been little to no study on how this pronoun is used in AI-generated texts. The current study fills this gap by examining the frequency and role of "I" in essays generated by an AI language model and comparing it with human-written essays.

RESEARCH METHODOLOGY

This study employs a corpus linguistics approach, using the AntConc software to analyze the frequency and distribution of the first-person pronoun "I" in AI-generated and human-written essays. A separate corpora was created for the two types of texts upon collection. A corpus can be defined as a collection of machine-readable authentic texts (including transcripts of spoken data) that is sampled to be representative of a particular natural language or language variety (McEnery et al. 2006, 5). Due to the unavailability of an existing corpus of AI-generated essays as of July 2024, this study relies on a self-compiled corpus, consisting of texts produced by ChatGPT-3.5, a freely accessible language model developed by the company OpenAI.

Population and Sample

The population for this study are academic texts produced by Generative AI models, and ones written by humans. To study the population, purposive sampling was employed and a set of two corpora of essays was created.

The AI-generated corpus consists of 100 essays generated by ChatGPT-3.5, totaling 29,442 words, while the human-written corpus also includes 100 essays with a total of 39,878 words. It is important to note that the human-written essays are all publicly available, were all written for the TOEFL exam of English proficiency, and collected and published by Dethi.com.

The AI-generated essays were produced by the author, by inputting a set of standardized prompts / essay topics into ChatGPT-3.5. All of the topics were publicly available at the website 5StarsEssays.com. The prompts i.e. topics cover a broad range of areas, ensuring a diverse sample reflective of typical academic writing. Similarly, the human-written essays were selected from a larger pool of TOEFL exam essays, ensuring they represented a range of scores and writing styles across different topics.

Following the guidelines established by McEnery, Xiao, and Tono (2006), the collected essays were then compiled into uniform digital corpora, with each text being carefully formatted to ensure consistency in the analysis. The primary focus of the analysis was on identifying and quantifying the use of the pronoun "I" in each corpus, with the results being compared to determine any significant differences.

Analysis

The analysis was conducted using AntConc's keyword and concordance tools. Keyword analysis was employed to identify the prominence of "I" in each corpus, while concordance analysis provided insights into the context in which "I" was used.

Hypothesis

The main hypothesis of this study is that: *AI-generated essays will use the first-person pronoun "I" significantly less frequently than human-written essays.* This difference is expected to reflect the model's tendency to produce more objective and impersonal text, in contrast to the subjective and personal nature of human writing.

Limitations

It's important to acknowledge this study's limitations, to ensure it can be redone in the future, considering all the ways in which it was limited. Firstly, the study includes a limited, self-made corpus of only 200 essays with a total of 69.320 words. Secondly, the AI corpus consists of essays written exclusively by the free version of the ChatGPT model – ChatGPT 3.5. Additionally, the human-written corpus is about 35.4% larger in word quantity than the AI one. Despite this, the study is considered to provide valuable insights into a topic that has not been empirically researched as of yet.

Ethical Considerations

The study adhered to ethical guidelines by ensuring that all data used was either publicly available or generated using ChatGPT within the bounds of OpenAI's terms of service. No personal or sensitive data was included in the analysis.

Conflict of Interest

The author hereby declares no conflict of interest.

RESULTS AND DISCUSSION

General Remarks

The analysis of the 100 AI-generated essays reveals a total of 29,442 words (referred to as "running tokens" in AntConc) and 4,126 distinct words in the first corpus. In contrast, the 100 human-written essays in the second corpus, while longer with a total of 39,878 words, contain only 3,877 distinct words. Despite being longer, human-written essays have a lower number of unique words compared to AI-generated essays. This suggests that AI-generated texts may use a more diverse vocabulary.

To further illustrate this difference, a type-token ratio (TTR) was calculated for each of the two corpora. The TTR1 for the AI-generated essays is 14.00%, calculated by dividing the number of distinct words by the total word count [(4,126 / 29,442) * 100]. The human-written essays have a TTR2 of 9.71% [(3,877 / 39,878) * 100]. The percentage difference between these TTRs is approximately 30.64%, which shows a notable disparity.

This indicates that, although human-written essays are approximately 35% longer in total word count, they exhibit a significantly lower type-token ratio compared to AI-generated essays. This may suggest that human writers tend to focus on lenght at the expense of vocabulary variety.

The use of the personal pronoun "I" in AI-generated essays

The AntConc analysis for the keyword "I" reveals that the first-person singular pronoun in this corpus is almost entirely nonexistent. In fact, the only instances of "I" occur in so-called narrative essays, and even there, the pronoun is used very sparingly—just 15 times in a corpus of 29,442 words. This results in a frequency of use of about 0.051%.

When analyzing the frequency list, generated by AntConc, it's interesting to note that the personal pronoun "I" does not even appear among the top 100 most frequent words in the corpus.

It is important to note that "I" appears in the corpus 13 more times, but not as a pronoun but as the number 1, represented by a Roman letter, in the phrase "World War I".

The use of the personal pronoun "I" in human-written essays

The obtained results from the second corpus contrast sharply with the results for AI-authored essays. In this corpus, the pronoun appears in every essay without exception, sometimes only once, but often – multiple times per essay. Specifically, in the 39,878-word corpus, the pronoun "I" is used 523 times, which means the word has a frequency of about 1.311%.

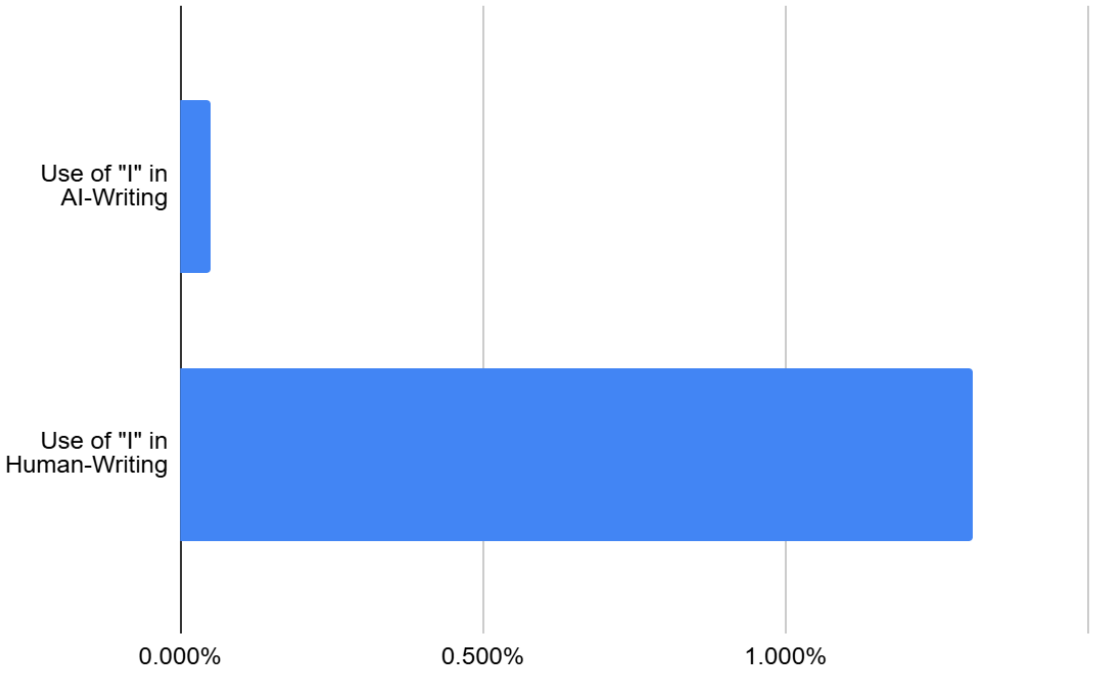
In this corpus, the pronoun in question ranks as the 9th most frequent word.

DISCUSSION

These findings suggest that AI-generated texts are more objective and neutral, focusing on presenting information rather than conveying personal opinions, attitudes, and experiences. Human-written texts, on the other hand, are "littered" with instances of "I". This higher usage of the pronoun reflects the subjectivity inherent in human writing.

The marked difference in the use of "I" not only indicates a lack of subjectivity in AI-generated texts but can also serve as a tool for distinguishing between human-authored and machine-generated content. Simply put, the more "I"s one can see, the more likely the text was written by an actual human.

According to these findings, human writers are 25.7 times more likely to use the pronoun "I" compared to Generative AI models. Humans use the pronoun frequently, which is in line with previous findings (Tang & John 1999; Chung and Pennebaker 2007 etc.) This also aligns with Popescu's assertion (2007, 184) that the pronoun "I" is among the most frequently used words in her corpus of student essays. To better illustrate the frequency difference, the results are also presented in Graph 1 below:



Graph 1: Use of the first-person pronoun in AI and Human Essays

CONCLUSION

This study reveals a distinct divergence in the use of the first-person singular pronoun "I" between human-written and AI-generated essays. The AntConc analysis of the two corpora, shows that AI-generated texts demonstrate a marked absence of the pronoun "I," with a frequency of only 0.051%. Unlike them, humans seem to be using “I” much more frequently as their essays show a significantly higher frequency of the pronoun at 1.311%, ranking it as the 9th most frequent word in the corpus.

This pronounced difference in pronoun usage not only highlights the inherent subjectivity in human writing but also provides a clear metric for distinguishing between human and machine-generated content.

Future research could, of course, expand on this and investigate the usage of the pronoun "I" in AI-generated texts across various other free and subscription-based AI models to further enhance our understanding of AI-generated written discourse and the ways it is (still) limited.

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Section A

FEMALE CHARACTERS' RELATIONSHIP TOWARD THEIR BEAUTY IN LITERARY WORKS

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Abstract

The research question in this paper is related to the way female characters are described in the literary works of foreign and domestic famous authors with the aim to showcase their relation with the beauty specifically personal, self perceived beauty, and their differences and similarities. Sampled are 11 female characters from different time periods, starting from ancient times to the present day. The analysis rests on the actantial model and on the qualitative content analysis in which the coding is the base. Five categories of female characters, i.e. women who treat their personal beauty in a different way are distinguished: women who perceive themselves as unmatched beauties or who are vain or narcissistic in the world, then there are the opposite types of narcissists, those beauties who remain indifferent to their own beauty, then women who fear their beauty, cold beauties and finally, those whose beauty is untouched by time.

Keywords: qualities, beauty, beauty characters, narcissism, indifference.

INTRODUCTION

Women are and were object of inexhaustible inspiration in many literary works. The female's world is a story for itself. The beautiful and gentle woman is a wonderful creation of the nature. She is predestined for reproduction and saving the humankind. She is a symbol of braveness, she is the pole of the family, and she is the warmth of the home. Many authors

describe her external specific features, and admire her unusual beauty. Others narrate her inner particular aspects. There are also creators who find the beauty of the woman in her soul.

Everyone is familiar with Elena and Antigone from the ancient literature. The first ennobles with her external beauty in front of which no man stands indifferently, and the second exalts with her character. She opposes the king and buries her brother motivated by the family and the gods. She is not afraid for her own life in any moment, and she sacrifices in the name of the family values. Who cannot value such a woman?

Many famous authors express ideas on the woman's beauty. For instance, Shakespeare praises the woman's beauty and grace: "She is speaking, yet telling nothing." "The years cannot whiter her eternal attractiveness, neither her charm." Shakespeare respects the woman completely: "I draw the following doctrine form the women's eyes: They are the base, the books, and the academia from where the real Prometheus fire springs."

Taking into account that with their beautifulness and elegance, women are constantly motivating authors, the present paper deals with the various points of views of some female characters in the literary work of famous authors from the ancient times until nowadays. The aim of the paper is to indicate their association with their beauty and demonstrate their distinctive nature and their resemblances. Thus, 11 female characters are sampled and analyzed through the lens of the actantial model and the qualitative content analysis.

BROADER RESEARCH CONTEXT

Worldwide there is a substantial body of research exploiting the female characters in fiction from various points of view.

Forshey (2008) scrutinizes the female characters of Ibsen's play regarding the topic of captivity which includes all forms of mental and emotional bondage to an outside entity. She also indicates that these characters have misconstrued identity leading to a lack of understanding or belief in themselves. Exploiting Beauvoir's observations, Dwomoh (2013) explores Hemingway's depiction of five women in a single novel and she states that the female characters are perceived as the others, which assume their subordinate roles. Kwatsha (2015) portrays women characters in the works of many African women authors and presents that the female characters are depicted as strong, resistant, and independent, and as characters who are not a passive receivers of the patriarchic norms. Bryndová (2016) analyzes the representations of women's narrative in Carter's fiction who focuses on criticism of stereotypes established in western cultures. She demonstrates that Carter's heroines are individual women who are searching for their identity. Bot (2020) investigates three female characters from the work of Alcott, Harper Lee and Sommers) and showcases aspects of their physical appearance, mannerism/behavior, and aspirations. She concludes that these gender bending characters have strong influence upon the readers. Amro (2021) argues the stereotypical readings of women's depictions in medieval literature as presented in Beowulf, Cynewulf's Juliana, and sir Gawain and the green knight, and provides a deeper understanding of these women's roles within the cultural and historical contexts of these literary works. Cai (2022) analyses the female consciousness and female image in British and American literature and unveils the female's rebellious spirits, their awakening and their social status. Chen, Liu, & Shi (2023) describe the influence of western feminism on Chinese feminist literature in the 1980s and claim that the western literature reinforces the women's submissiveness while the Chinese is marked by the women's democracy and liberation. Keying (2024) examines the female characters in

Hemingway's work and states that in his work, female character are depicted in rich and different ways and that they have independent social status. He further notices that Hemingway delves into women's inner world and portrays their tenacity and bravery. Using critical analysis, Shanmuga Velu (2024) explores the restrictive roles assigned to women in the Victorian period, stressing out their struggles and accomplishment. Sharma & Sharma (2024) survey the woman's resilience and empowerment in work of Walker and demonstrate the transformation of the main protagonist from subjugation to independence, reflecting themes of consciousness and liberation. They further display the struggle of the Black women in a racist and sexist society. Mangarin & Bungabong (2024) explore the women's trait in four Philippine masterpieces and find out that women are depicted as resilient and strong, that they have moral integrity and courage, they advocate for social changes, they are wise, intelligent, loyal, and loving. Roy (2024) shows the nuanced roles of the women in the Shakespeare's tragedies and emphasizes the way in which the female characters navigate power, agency, and rebellion within the patriarchal context. Khan (2024) reveals that women in Shakespeare's tragedies are often portrayed as victims of male ambition and jealousy, while women in his comedies are depicted as witty, intelligent, and independent.

METHODOLOGY

The present research seeks to find out the various ways in which the famous female characters are portrayed in the literary works of foreign and domestic authors, and the aim is demonstrate their association with their own self perceived beauty, their contrasts and resemblances. The characters are considered to possess extraordinary female beauty, i.e. they are characters – beauties, and their beauty is a gift from god or rare beauty. The authors are chosen due to the fact that they are masters of narration and they delve into the depth of the woman's emotion and the woman's psychological features.

Sampled are 11 female characters, i.e. the description of their beauty from different time period, from ancient times to nowadays. This sample is purposeful which is in accordance with the attitude of Lincoln & Guba (1985) who claim that each sample is collected with a certain goal. Further, the sample is based on data in textual form which is in accordance with Yin (2011) who states that data in textual form can be seen as a sample. Furthermore, this sample is, in fact, a type of corpus Do It Yourself, which according to Hardie (2016) allows tailoring the data to suit the researcher's need.

The analysis of the data rests on the actantial model introduced by Greimas (1978) and further developed by Ibersfeld (1982) which is used to analyze thematized action, particularly those depicted in literary texts. The analysis considers the qualitative content analysis (Schreier, 2014) in which the coding is the base.

RESULTS, ANALYSIS, AND DISCUSSION

As a result of the coding process, five categories of female characters emerge.

In the first category, named as beauties with strongly pronounced self-admiration (narcissism), with special attention and psychological excerpts, the characters of the Beloved from the oldest and most beautiful song *Pesna nad pesnite* [Song of Songs] and the Queen from the most popular and widely read fairy tale of all time Snow White and the Seven Dwarfs are portrayed. Those facts that reveal the named characters' attitudes toward their own beauty in

terms of self-admiration are pointed out. For the first character, the Beloved, this is in a discrete form, while for the second, the Queen, it is in the most pronounced form, bordering on madness.

In the second category of beauties with an innate indifference to their own beauty, the characters of Remedios Moscote from Márquez's novel *Sto godini samotija* [One Hundred Years of Solitude], Elena from Chekhov's play *Vujko Vanja* [Uncle Vanya], and Tatiana Larina from Pushkin's first novel in verse *Evgenij Onegin* [Eugene Onegin] are analyzed.

The third category consists of beauties who have a fear of their own beauty. These are characters who change the course of events in their own lives and in the lives of all their entire surroundings, such are Cveta and Kalesh Angja from Macedonian literature, then Katinka from the short story *Patot na Alija Gjergelez* [The Path of Alia Gjerzelez] by the Nobel laureate Ivo Andrić. Even though these women do nothing regarding their beauty, meaning they do not emphasize it, their natural beauty is so powerful that they themselves fear it and its influence.

A less common example is the category of beauties with a cold beauty, which is the fourth category where the primacy belongs to Gerda from the novel *Budenbrokovi* [The Buddenbrooks] by Thomas Mann. This character is particularly intriguing for research and psychological analysis, because Gerda's cold inner energy destroys everything beautiful, including her own physical beauty, and ultimately she is indirectly responsible for the downfall of the Buddenbrooks family.

In contrast to this category, the paper also explores the category of characters – beauties who possess more qualities that make them more beautiful with age. These are strong, courageous women with powerful beauty who manage to maintain both physical beauty and spiritual strength in a wonderful balance as they age. From contemporary Macedonian literature, such a character is Dosta Rozhdenkata from the novel *Krpen zhivot* [Patched Life] by Stale Popov and and from world literature, the character of Irene from John Galsworthy's novel *Sagata na Forsajtovi* [The Forsyte Saga].

STRONG EMPHASIZED VANITY (NARCISSISM)

Beauty, which has evolved from human necessity, has not changed much except that it has become more essential for the survival of humans and the entire human race from ancient times, from the period of the creation of the *Song of Songs* to modern aesthetic medicine. Self-admiration is an ancient theme. In the most beautiful and oldest poem, *Song of Songs*, a type of woman, the Beloved, is subtly introduced. She is flattered by the compliments of the Lover, and for each of his beautiful words, she responds with even more attention, wanting to hear once again how special she is. However, all of this seems to be within the bounds of a seemingly romantic infatuation, and the reader cannot immediately recognize the woman's need to be special. In these verses, self-admiration intertwines with the veil of love, which comes to the forefront.

Beloved: I am the rose of Sharon, and the lily of the valleys!
Beloved: As the lily among thorns, so is my love among the daughters.
Beloved: As the apple tree among the trees of the wood, so is my beloved among the sons. I sat down under his shadow with great delight, and his fruit was sweet to my taste.
He brought me to the banqueting house, and his banner over me was love.
Stay me with flagons, comfort me with apples: for I am sick of love.
His left hand is under my head, and his right hand doth embrace me.

Beloved: I charge you, O ye daughters of Jerusalem, by the roes, and by the hinds of the field, that ye stir not up, nor awake my love, till he please (Holy Bible 2006, 687).

If we analyze vertically one of the oldest and most popular stories of all time (actantial analysis), we come to the concludion that the queen obsessively desires to be the most beautiful. Her desire exceeds the limits of reasonable behavior. This obsessive desire is the driving force or motivation that determines the subsequent action of the fairy tale. To achieve her goal, she plans to murder Snow White, who, according to the magic mirror, is more beautiful than she is. Everything encountered after the character of the wicked queen in the pages of prose and dramatic works is an innocent game. The wicked queen holds a primacy in the group of women with strongly pronounced self-admiration (narcissism).

INDIFFERENCE TOWARDS ONE'S OWN BEAUTY

The opposite of narcissism is indifference to one's beauty. Remedios Moscote, "a beautiful girl with a lily-white complexion and green eyes, graceful and well-mannered", (Marquez, 2000) is an episodic character in *One Hundred Years of Solitude* (Marquez), who is gifted by God with unprecedented beauty. She shows total indifference, and this only drives men who desperately desire her even more mad. One of those men is Aureliano, about whom Marquez says: "There was peace for everyone, except for Aureliano.The image of Remedios, the chief's youngest daughter, who by her age could have been his daughter, remained like a painful wound in one place of his body. It was a physical feeling that even interfered with his walking, like a pebble in his shoe" (Marques, 2000).

The group of female characters who treat their beauty with indifference include traditionally educated women such as Elena from *Uncle Vanya* (Chekhov) and Tatiana, a character from the first verse novel *Eugene Onegin* (Pushkin). If they were different types of women, they they might have found the courage to challenge the stereotypical environment and the belief that personal feelings are to be suppressed for the sake of the happiness of their surroundings, rather than for the happiness of their own children, whom they do not have. These characters seem to become indifferent not only to their own beauty but also to the intensity of their own feelings; they become everything except themselves. They become "lukewarm" toward both their beauty and their emotions, thereby losing their own sense of self. They are antipodes in physical appearance – Elena is a blonde beauty with large eyes, while Tatiana Larina is a beauty with long, amber-colored hair and brown eyes with the grace of a fawn. However, they are equivalent in their way of thinking; they exemplify traditionally raised Russian women who sacrifice themselves for the honor of their families.

WOMEN WHO FEAR THEIR OWN BEAUTY

In literature, it is not uncommon to encounter female characters, beauties, who are afraid of themselves or their own beauty. Initially, this seems paradoxical, but there are historical facts that support this statement. These are strikingly beautiful women living in oppressed or extremely undemocratic countries. Such is the case with our Veta (Chernodrinski) and Kalesh Andja (Stale Popov). The beauty of these two heroines alters the course of their lives and the lives of their families and broader surroundings. Both live in fear and anxiety, trying to conceal their beauty from the enemy, the Turk, but this is in vain. This is beauty that awakens Eros, who,

as a driving force, prompts Osman Bey (*Makedonska krvava svadba – Macedonian Blood Wedding*) and the Kadi (*Kalesh Angja*) to resort to abduction. In these identical cases, which are not unique in Macedonian literary creation and were even more numerous in our historical past, the authors depict beauty with particular fervor, offering detailed descriptions of black eyebrows like leeches, rosy cheeks, full lips, firm breasts, and slender waists. These are attributes that could not go unnoticed by the Turk, the enemy, despite the modesty of the girls who, at no point, appear as emitters of non-verbal signs with a conative function; on the contrary, they try to prevent their beauty from being highlighted.

Both Osman Bey and Kadi are subjects with their own predicates and objects. In other words, they have a clearly articulated action and specific goals. However, their goals will not be achieved because strong opponents come into sight as expressed through the language of actantial analysis, form conflict triangles. In *Macedonian Blood Wedding* that opponent is Spase, and in *Kalesh Angja*, it is Stojan Ristev. Spase and Cveta are in love, and their love is blessed by their families. The father is tolerant of his daughter's wishes. Here, the plot has patriotic implications. Osman Bey abducts a beautiful Christian woman (Cveta). After the abduction, comes the act of rescue, i.e., liberation. Osman the Bey is not just a personal enemy but also a national enemy.

With *Macedonian Blood Wedding* Chernodrinski masterfully crafts a narrative, managing to organize a Macedonian national theater on foreign soil through what appears to be a "naive love story" and successfully deceives the censors with a complete patriotic engagement.

Chernodrinski and Stale Popov, through the characters of the beauties Cveta and Kalesh Andja, have painted the characteristics of strong Macedonian women throughout the ages, who were proud of their beauty and identity, their faith, and who withstood pressure and did not succumb to the opulence of life. These are characters who do not have a mercantile value as commodities for sale, but rather a higher category of human existence where dignity and consistency are paramount. This is a category worth living for, and if necessary, worth dying for. Cveta dies for Spase (meaning Savior), but also for her family, and the family, not only for Chernodrinski and his followers but generally in our history and especially in tradition, functions as a synecdoche for the homeland – Macedonia.

Kalesh Angja and Cveta can be considered synonymous characters according to the terminology of Mladenoski (2014): "Synonyms are two (or more) characters whose semantic structures overlap to a certain degree, i.e., those with a greater number of shared features. The degree of synonymy will depend on the quantity and quality of the shared features (identical labels/attributes). This will be observed both at the level of qualities (properties) and at the level of predicates (actions). The analysis should determine the degree of interference (overlap) of the semantic composites of the two characters."

When it comes to the term 'features', these are meaningful units that define the character, marking its qualities. They are structural narrative elements that, step by step, create an image of the character for the reader. The more semes a character structure contains, the clearer the image that the reader reconstructs for that that character (Mladenoski, 2014).

Many beauties in the stories of Andrić hide their eyes from curious passers-by, tie up their hair, and quicken their pace. And this, to spite their adversaries, makes them even more beautiful, even more desirable. One such character is Katinka in the story *The Path of Alia Gjerzelez*. There was always talk about this beauty, songs were sung about her, yet she didn't know what to do with herself and her beauty. Before Katinka's extraordinary beauty, even the powerful and strong Alija Gjerzelez is left confused. Here is the moment of his reaction when he

sees her for the first time: "He looked at her for a moment, standing with his legs apart and squinting a little at his right eye, then he laughed softly and, spreading his arms and almost jumping, moved towards her" (Andrić, 1966). Before such a reaction, Katinka just closes the front door and locks it. After this encounter, Alija Gjerzelez completely changes his way of thinking and living. The only thing that occupies his mind is the thought of Katinka; he constantly inquires about her, fantasizes about her, and is obsessed with her. Every day he comes to the halva shop opposite Katinka's house, hoping to catch even a glimpse of her.

"Katinka was the daughter of Andrija Poljash, unhappy because of her beauty, about which songs were sung throughout Bosnia. People knocked on their house because of her. She was never allowed to go out. On holidays, they took her in the early dawn to mass in Latinluk, wrapped in a bundle like a Turkish woman, so she wouldn't be recognized… she often cried all day long, not knowing what to do with her life and her cursed beauty. She cursed herself, biting her lips and struggling in vain, in her great innocence, to discover what was so 'shameless and Turkish' about her that drove men mad and made soldiers and bailiffs circle around their house, and why she had to hide and be ashamed, while her family lived in fear. And every day, she became more beautiful" (Andrić, 1966). It can be said that she was not 'afraid of' her beauty, but she was deeply unhappy because of it and she couldn't even comprehend it. And all of this is primarily instigated by the overwhelming attention her physical appearance provoked in male individuals.

CHARACTERS OF WOMEN WITH COLD BEAUTY

In literature, there are characters of women with cold beauty. One such character is Gerda, a beautiful woman, but her beauty is cold, bringing misfortune to her family, her husband, and her children. This character was created by Thomas Mann in his novel *Buddenbrooks*. Here is how Consul Thomas Buddenbrook describes his future wife in a letter to his mother:

"Gerda, I met her again: tall, well-built, beautiful... I made my decision that very day: this one or no one else, now or never! (Mann, 2013). A few pages later, in the first volume, the author depicts Gerda like this:

"That twenty-seven-year-old girl was marked by elegant, exotic, mysterious beauty that attracted attention: lush dark red hair, brown eyes... her face was matte white and slightly haughty, but it hid when the consul's wife warmly clasped her head with her hands and kissed her on the forehead, white as snow and flawless..." This beauty behaves coldly toward her surroundings and toward her own beauty. Her constant nervousness and forced politeness toward those around her, combined with her strange living habits, bring misfortune to her and everything around her.

Thomas Mann completely confirms the downfall of the Buddenbrooks family with Gerda's departure to Amsterdam. It's seems as he wants to emphasize the power of a woman in the rise or fall of a family. In this way, the author's cleverness points to the source of a woman's inner beauty, which is life energy, positive thought, without which external beauty cannot endure. It cannot be sustained and cannot be productive, neither for the family nor for the wider environment. External beauty cannot survive without internal spiritual beauty and strength, and the best example of this is Gerda. All the wealth and luxury are in vain when a woman doesn't know how to enjoy a beautiful sunny morning or a lovely day, when she doesn't know how to offer a kind word, a smile to those she loves, or words of comfort to those who need it. Instead,

the beautiful, cold Gerda chooses something else entirely. Instead of the sun, she chooses darkness:

"She hated outings like this one today, especially in the summer, and on a Sunday, no less. She, who kept her rooms in semi-darkness, with most of the curtains drawn, rarely went out. She feared the sun, the dust, the festive clothes of the bourgeois, the smell of coffee, beer, and cigarette smoke... and besides, she hated being disturbed by people..." (Mann, 2013). This character's affinity for darkness rather than the sun brings darkness – it brings the death of her husband, her son...

CHARACTERS OF WOMEN WHO BECOME MORE BEAUTIFUL WITH AGE

In both local and world literature, it is not uncommon to encounter female characters who grow more beautiful as the years go by. One such character is Irene, from *The Forsythe Saga*, a woman with powerful beauty, who is driven by the motivational force of the so-called 'addressor' that generates her actions or predicates, granting her a status of being without alternative. She resonates with this heavenly motivational force and manages to reach the apex of happiness – the eternal longing of the beautiful woman, from *Song of Songs*, for all time. This heavenly motivational force is so intense that it enables the beautiful Irene to endure ten years of a love ordeal and to stand before the man worthy of her boundless love, the younger Jolyon. He embraces her and feels the trembling warmth of her lips, unkissed for ten years. If they were married in Roman times, she would surely have joyfully recited the solemn bride's vow before the magistrate: *Ubi tu Gaius, ego Gaia* (I will be your faithful wife forever, a devoted mother to our children, a good companion, and a sincere friend). One year later, Irene gave birth to Jolyon's son. They named him John. Little John admired his mother's beauty:

"As he ate jam under the old oak, he noticed things about his mother that he had never noticed before. Her cheeks, for example, were milky white, and in her red-gold hair, there were silver strands... this new beauty of his mother had a special importance, so much so that he ate less than he thought he would" (Galsworthy, 2014). Irene was just beauty in the world of this little child, one day he looked into her beautiful dark brown eyes and said that she was very beautiful. The mother defended herself that she was no longer young and that she had the first wrinkles around her eyes and that she had entered her fourth decade. The son born with love replied to her that wrinkles are sun rays on her face. The father observed the mother and son from a certain distance and thanked God for blessing him with a good wife, who was more and more beautiful with age.

Irene was the embodiment of beauty in the eyes of this little child. One day, gazing into her beautiful dark brown eyes, he told her she was very beautiful. His mother, smiling, defended herself, saying that she was no longer young, that she had the first wrinkles around her eyes, and that she was entering her forties. The little boy, born out of love, lovingly responded that the wrinkles were not wrinkles but rays of sunshine. The father, watching from a distance, observed the mother and son, and thanked God for blessing him with a good wife, whose beauty the years had not managed to touch.

Irene was always dressed with special taste, wearing French-style clothing, and her dresses blended with the ideal contours of her extraordinary beauty. Like Andrić, Galsworthy creates a unique poetics of Aphrodite-like forms through clothing, achieving this through synecdoche.

In contemporary Macedonian literature, the character of Dosta Rozhdenkata (from the novel *Patched Life*) can, by many qualities, be placed in the category of female characters who become more beautiful with age. Dosta is a woman who has managed to maintain a miraculous balance between physical beauty and inner strength. She is a fighter, guided by the motivational heavenly force of the addressor, who does not give up at the first obstacles she encounters. After her husband's death, she manages to reach Ilko, with whom she achieves the pinnacle of happiness. Stale Popov describes Dosta's physical beauty like this:

"Dosta's face is white and ruddy, kalesha, as they say. But not black. Black eyes, black eyebrows, black hair, pale face, small white teeth, swollen reddish lips, straight nose, small ears, a graceful neck... All of it – even more beautiful than Our Lady! Ilko tells himself. And her figure? Tall as a rifle, chest thrust forward, slender waist, long legs, shapely arms, clean nails, washed and neat as if before a man, as the Mariovo people would say" (Popov, 2000).

The years do not manage to touch Dosta's beauty. Not only do they fail to diminish it, but one could say they enhance her femininity, about which all of Mariovo spoke: "After the birth of Neshka, her face cleared up and became even whiter than it was, her eyes sparkled like lightning, her hair was neatly arranged, and her loosened curls, like silk, covered her ears!... And she knew how to carry herself like the devil! She only looked straight ahead, never looking at anyone unless necessary and never talking without need."

Her determined character, her persistence, and her refusal to conform to the crowd that thought differently from her, is the main 'culprit' for her physical appearance − a woman people talk about, a woman before whom no one is indifferent. Some envy her, while others admire her: "Conversations about Dosta are frequent, comparing her with other brides and girls, with compliments being exchanged – some decent, others exaggerated, as is the Mariovo way. Some even reached Ilko's ears, but he was secure, knowing Dosta was well-placed, he loved her, and she loved him, so there was no need for worry."

The years passed for Ilko and Dosta; their love endured, their beauty endured. Stale Popov masterfully, yet subtly, shows this in the final page of the novel: "Well, Docko! Patched life, but here we are, even with patched, we managed better than with new. May your son-in-law and daughter live long, so you can boast of them!"

CONCLUSION

Throughout the literary pages, we encounter different profiles of beautiful women who react differently to their powerful external appearance – ranging from those obsessed with their beauty or narcissistic, through indifferent ones, to women who fear their own beauty, women with cold beauty, and those who become more beautiful with age or whose beauty remains untouched by time. Based on the analysis of these traits, we come to the conclusion about the negative consequences that obsession with one's own beauty can bring not only to literary characters but also to real-life situations.

Beauty is a sense of aesthetics that does not abandon a person over time. The search for this feeling continues today, with countless beauty salons, countless aesthetic procedures, all of which turn into a form of tyranny. In this sense, we can speak of tyranny over beauty but also the tyranny of the desire for beauty over the individual, their lifestyle, and psyche. Each era has its own ideal of beauty, and trends change within certain time frames. Looking through history, at one time fuller women were in fashion, then extremely thin women, followed by women with curves, and so on. Chasing what is trendy in beauty is an irrational act, and in doing so, the

objective nature of beauty is lost. Beauty lies in individuality, in diversity, or uniqueness. Attention should be paid to some other internal aspects of beauty, such as:

- Emotional beauty (shows how mature and stable a person is, and interacting with a stable and mature person, both professionally and personally, is an honor and pleasure for every individual);
- Mental beauty (the level of culture within a person, as well as their intellectual abilities, capacities, and creative skills);
- Character beauty (the integrity of a person, their ability to be consistent, self-reliant, and independent).

The comparison between Irene from The Forsyte Saga by John Galsworthy and Gerda from Buddenbrooks by Thomas Mann leads to the conclusion that Irene's beauty does not negatively impact her character. In fact, it subtly enhances her behavior towards others, who recognize and admire the wholeness of her beauty and soul. On the other hand, Gerda's beauty negatively affects her character and behavior. As we have seen, she becomes cold and reserved, and this behavior brings only destruction and downfall—both personal and familial.

In general, from all the analyzed life stories of women described as beautiful, we can conclude that a woman's beauty can lead to diametrically opposite outcomes in her life. It can be a blessing and a privilege or a curse and a problem for both the woman and her surroundings. On the other hand, a woman's beauty often does not align with the quality of her personality or mental capacity. Some women believe that the beauty God has given them is enough for them to have everything they desire, and they do not need to make an effort or possess other positive traits and human qualities. Without intellect, such individuals end up being ridiculous instead of dominant and, rather than inspiring admiration, they become objects of ridicule.

Neither beauty nor wealth, nor the combination of both, can replace or compensate for intellectual abilities, capacities, and skills.

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Section A

ETHICAL AND LEGAL ASPECTS OF THE USE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE SYSTEMS: A SUSTAINABLE DEVELOPMENT PERSPECTIVE

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Abstract

In the face of the dynamic development of artificial intelligence (AI) technologies in healthcare, this article analyzes the ethical and legal aspects of its use in an international context. The aim of the study was to identify key challenges related to the implementation of AI in medicine and to assess existing legal regulations and bioethical standards at the global level. The study employed a method of analyzing scientific literature, international legal acts, and reports from organizations such as the World Health Organization (WHO), the Organization for Economic Cooperation and Development (OECD), and the European Union. An assessment of existing legal regulations and bioethical standards in force at the global level was also conducted.
The results indicated significant problems related to the protection of patient data, lack of algorithm transparency, and potential inequalities in access to AI technologies. The legal analysis revealed fragmentation of international regulations and the need for harmonization of provisions to effectively protect patient rights and ensure clinical safety. The conclusions emphasize the necessity of international cooperation in creating uniform legal and ethical frameworks for AI applications in medicine. De legeferenda conclusions are shaped as follows: establishing global standards, promoting ethical programming, and educating medical personnel and patients in the field of AI technologies to maximize benefits and minimize risks associated with its use.

Key words: artificial intelligence, medical law, bioethics, healthcare, medical data protection, patient rights, AI ethics

INTRODUCTION

Nowadays, we can increasingly say that we are living in the future. The visions offered to us by science fiction films from over 30 years ago are becoming our everyday reality. Tablets, holograms, online meetings—these are solutions we eagerly embrace. The last few years of technological development have brought us another useful tool: artificial intelligence.

Artificial intelligence (AI) has become one of the most groundbreaking technological achievements of the 21st century, influencing almost every aspect of modern life. In the healthcare sector, we observe particularly dynamic development of AI applications, which promises to revolutionize the way diseases are diagnosed, treated, and prevented. From

analyzing medical images using machine learning algorithms, through predicting epidemics based on big data, to personalized medicine based on genome analysis—AI opens new perspectives for improving the quality and efficiency of healthcare.

The growing role of AI in medicine is driven by several key factors. Firstly, the global aging of societies and the increase in chronic diseases raise the demand for innovative medical solutions. Secondly, the enormous amount of data generated in the patient care process requires advanced analytical tools for effective utilization. Thirdly, advances in computational technologies and access to cloud computing power enable the development of increasingly advanced AI algorithms.

However, integrating AI into healthcare also raises a number of significant challenges. Issues such as privacy and security of patient data, transparency of algorithms, responsibility for decisions made by AI systems, and potential biases and discrimination resulting from errors in training data are becoming increasingly pressing. Moreover, the lack of uniform international legal regulations and ethical standards complicates the implementation of these technologies on a global scale.

In light of these challenges, an in-depth analysis of the ethical and legal aspects of AI use in healthcare is necessary. Understanding these issues is crucial to ensure that the development and implementation of AI occur responsibly, respecting patient rights and in accordance with bioethical principles. This article aims to present these issues, with particular emphasis on international law, and to indicate directions for future regulatory and practical actions.

ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Definition of AI and It's Applications in Medicine

Artificial intelligence (AI) is a field of science and technology focused on creating systems and computer programs capable of performing tasks that require human intelligence, such as learning, reasoning, pattern recognition, and decision-making[1]. According to McCarthy, one of the pioneers of AI, it is the science and engineering of making intelligent machines[2].

In the context of medicine, AI refers to the application of algorithms and computational models to analyze complex medical data, support diagnosis, predict disease progression, and personalize therapy.[3]Kaplan and Haenlein define AI as systems capable of correctly interpreting external data, learning from that data, and using the acquired knowledge to achieve specific goals through flexible adaptation.[4]

A key element of AI is machine learning, which allows systems to self-improve based on experience without explicit programming.[5]n medicine, machine learning is used in analyzing radiological images, detecting patterns in genetic data, and predicting patients' responses to specific therapies.[6]

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Definitions of AI increasingly include ethical and social aspects. The European Group on Ethics in Science and New Technologies describes AI as systems capable of autonomous action in complex environments, which can have a significant impact on people and society, requiring ethical and legal responsibility.[7]n this context, it is important that the development of AI in medicine aligns with bioethical principles and respects patient rights.

Current Technological Trends

Considering the enormous potential of technologies like artificial intelligence, the limits of its application have yet to be discovered. Observing its vast array of uses, one might venture to say that AI is not only a helpful tool in daily work but also the future of medicine. Below are some currently employed methods leveraging its capabilities:

1. **Deep Learning and Medical Image Analysis:** Deep learning has revolutionized the analysis of medical images. These algorithms can automatically detect and classify pathological changes on X-rays, computed tomography, or magnetic resonance images with accuracy comparable to medical experts.[8]An example is the detection of cancerous changes in the lungs or diabetic retinopathy.
2. **Personalized Medicine and Genetic Data Analysis:** AI aids in personalizing therapy by conducting complex and time-consuming analyses of patients' genetic and molecular data. Machine learning algorithms help identify genetic markers responsible for reactions to specific drugs, enabling therapy to be tailored to individual patient needs.[9]
3. **Telemedicine and Remote Monitoring:** The development of IoT devices and wearable technologies allows continuous monitoring of patients' vital parameters. AI analyzes real-time data, detecting abnormalities and alerting medical staff in cases of threats to life or health.[10]
4. **Chatbots and Virtual Assistants:** Despite occasional opinions on the low usefulness of chatbots, in healthcare, AI-based chatbots facilitate communication between patients and providers. They can provide information, schedule appointments, or monitor symptoms, increasing the accessibility of medical services.[11]
5. **Optimization of Clinical Processes:** AI is applied to optimize management in large medical facilities as well as smaller clinics and offices. Data analysis allows for better resource planning, supply chain management, and predicting ward occupancy.
6. **Development of Robotics in Surgery:** Although it seems drawn directly from science fiction, dynamic development—or even revolution—in this area is the near future of medicine. AI-assisted surgical robots enable precise procedures with minimal invasiveness. This results in faster patient recovery and reduced risk of complications.[12]

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7. **Combating Epidemics:** AI can model the spread of viruses, predict disease outbreaks, and assess the effectiveness of interventions to protect public health.[13]
8. **Data Integration:** AI enables the integration and analysis of data from various sources, such as electronic medical records, laboratory data, or patient information. This facilitates a comprehensive approach to care and more informed clinical decisions, paying attention to every detail and matching appropriate solutions.[14]
9. **Automation of Laboratory Diagnostics:** AI automates and accelerates diagnostic processes in medical laboratories, increasing efficiency and accuracy while minimizing the risk of incorrect results.[15]

The above are just some examples of AI applications in healthcare. Many other potential solutions are in planning, testing, or even purely conceptual stages. What recently seemed impossible is now in use, suggesting that in the near future, medicine may face many bioethical dilemmas.

ETHICAL ASPECTS OF USING AI IN HEALTHCARE

The development of artificial intelligence (AI), particularly in medicine, opens up new diagnostic and therapeutic possibilities while confronting society with a series of ethical dilemmas. Introducing AI into clinical practice requires not only assessing its effectiveness and safety but also reflecting on its impact on patient rights, principles of social justice, and individual autonomy. Technology capable of analyzing vast amounts of data and making decisions may disrupt traditional relationships between patient and physician and raise questions about responsibility for potential errors. In the face of these challenges, it is necessary to examine how to ensure the ethical use of AI in healthcare, respecting fundamental bioethical values and norms.

Privacy and Confidentiality of Patient Data

Artificial intelligence operating on datasets composed of patients' medical information is a ticking time bomb. Medical data is particularly sensitive, and its protection is crucial for maintaining patient trust in the healthcare system. AI systems require large datasets to train and refine algorithms. Collecting this data often includes personal and medical information, posing risks of privacy breaches.[16]

AI-based systems are susceptible to cyberattacks, which can lead to theft or manipulation of patient data.[17]Data breaches can have severe consequences for patients, including discrimination, loss of trust, or financial harm. One of the most critical issues is properly securing access to collected data and ensuring its correct storage to prevent accidental

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deletion, which in extreme cases could threaten patient health or life. Inadequate security can lead to unauthorized access or use of data for purposes inconsistent with their original intent.

Another significant issue involves problems related to collecting and storing data and using it to feed AI systems for learning purposes. To protect patient privacy, techniques like anonymization and pseudonymization are often employed. **Anonymization** involves removing or modifying personal data so that identifying the individual becomes impossible or extremely difficult. Anonymization is one of the most commonly used methods of personal data protection, particularly popular in Europe in the early 21st century. In the United States during the same period, the term "coding" was used in a similar context. According to the **ISO 29100:2011** standard, anonymization is a process involving the irreversible transformation of information identifying a person. The goal is to prevent identification of that person, both directly and indirectly, by the data controller or in cooperation with other entities. This process ensures that data cannot be attributed to a specific natural person, even using additional information or advanced analytical methods. Thus, individual privacy is protected, and the risk of personal data breaches is minimized. Anonymization is crucial when using large datasets in AI, where data is necessary for training models but must be processed in compliance with data protection regulations.[18]

Pseudonymization is a concept introduced into legal science through the **Regulation (EU) 2016/679** of the European Parliament and of the Council of 27 April 2016 on data protection (GDPR).[19]. Article 4 point 5 states: "'pseudonymization' means the processing of personal data in such a manner that the data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organizational measures".

Studies indicate that even anonymized data can be re-identified using advanced analytical methods.[20]The development of sophisticated analytical techniques and the availability of large datasets increase the possibilities of de-anonymizing information.[21]This raises questions about the effectiveness of current data protection practices in the era of big data and AI. For example, Sweeney demonstrated that 87% of the U.S. population could be identified based on a combination of zip code, date of birth, and gender.[22]In the medical context, this risk is particularly high due to the uniqueness of clinical data.

To protect patients from AI errors and data leaks, increasingly advanced protection methods are being introduced. One proposed solution is **differential privacy**, which provides mathematical guarantees of privacy protection by adding controlled noise to data or analysis results.[23]This technique allows obtaining valuable statistical information without revealing individual patient data.

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[18]Maricniak, B., Strapagiel, D., Topolski, P., *Anonimizacja w dobie wielkich danych – sytuacja biobanków w kontekście RODO*, Studia Iuridica, LXXII, p. 75.

[19]Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Journal of Laws EU. L. of 2016, No. 119, page 1, as amended).

[20]Rocher, L., Hendrickx, J. M., Montjoye, Y. -A., 2019, *Estimating the success of re-identifications in incomplete datasets using generative models*, Nature Communications, 10, online: https://www.nature.com/articles/s41467-019-10933-3

[21] Ohm, P., 2010, *Broken Promises of Privacy: Responding to the Surprising Failure of Anonymization*, UCLA Law Review, 57(6), 1701-1777.

[22] Sweeney, L., 2000, *Simple Demographics Often Identify People Uniquely*, Carnegie Mellon University, Data Privacy Working Paper, 3.

[23]Dwork, C., & Roth, A., 2014, *The Algorithmic Foundations of Differential Privacy*. Foundations and Trends in Theoretical Computer Science, 9(3–4), 211-407.

Another approach is federated learning, which enables training AI models without centralizing data. Data remains on local devices, and only model updates are aggregated, minimizing the risk of privacy breaches.[24]

Justice and Access to AI Technologies

The use of artificial intelligence (AI) in healthcare promises significant improvements in the quality of medical care but also raises questions about justice and equality in access to these advanced technologies. Gaps between algorithmic outputs and human ethical perceptions can have serious consequences for individuals and entire societies.[25]here is a risk that the benefits of AI will be unevenly distributed, potentially deepening existing health inequalities between different social groups and regions.[26]

In developing countries, access to modern medical technologies is often limited due to a lack of infrastructure and financial resources. The World Health Organization (WHO) pays particular attention to the unjust distribution of technology. Topics such as e-health, telemedicine, or large databases should be considered, accounting for all difficulties in access and possibilities of infrastructural development.[27]Neglect in this area can lead to situations where only wealthier societies fully benefit from AI achievements in medicine. This undoubtedly contradicts the principle of justice in healthcare.

Moreover, even in developed countries, there may be disparities in access to AI between urban and rural areas, where technological infrastructure is less developed. Such disparities can result in poorer health outcomes for marginalized populations. Currently, there is no internationally agreed strategy for measuring and analyzing patient harm, hindering the monitoring of safety improvement programs. In low- and middle-income countries (LMICs), significant data gaps lead to probable underestimation of the actual burden of patient harm; investments in high-quality medical records and better research standards are necessary. Transitioning from a "blame culture" to a "just culture" and implementing coordinated, systematic measurement methods are key to effectively preventing future adverse events.[28]

The principle of justice in bioethics requires that all patients have equal access to healthcare and medical innovations.[29]To counteract inequalities, policies supporting technology transfer and capacity building in lower-income countries are proposed, along with adhering to recommendations on digital interventions for health system strengthening. It's crucial to consider population diversity in the algorithm design process to avoid biases and discrimination.[30]

LEGAL RECOMMENDATIONS ON ARTIFICIAL INTELLIGENCE AT THE INTERNATIONAL LEVEL

[24]Konečný, J., McMahan, H. B., Ramage, D., &Richtárik, P., 2016, *Federated Optimization: Distributed Machine Learning for On-Device Intelligence,* online: https://arxiv.org/pdf/1610.02527
[25]Mittelstadt, B. D., Allo, P., Taddeo, M., Wachter, S., &Floridi, L., 2016, T*he ethics of algorithms: Mapping the debate*. Big Data & Society, 3(2), 1–21.
[26]Vayena, E., Blasimme, A., & Cohen, I. G., 2018, *Machine learning in medicine: Addressing ethical challenges.* PLoS Medicine, 15(11).
[27]World Health Organization, 2016, *Global diffusion of eHealth: Making universal health coverage achievable,* online: https://iris.who.int/bitstream/handle/10665/252529/9789241511780-eng.pdf?sequence=1&isAllowed=y
[28] World Health Organization, 2024, *Global patient safety report,* online: https://www.who.int/publications/i/item/9789240095458
[29] Beauchamp, T. L., & Childress, J. F., 2001, *Principles of Biomedical Ethics*, Oxford University Press, p. 230.
[30] Obermeyer, Z., Powers, B., Vogeli, C., & Mullainathan, S., 2019, *Dissecting racial bias in an algorithm used to manage the health of populations*, Science, 366(6464), 447–453.

UNESCO

In 2021, UNESCO developed a report titled **"Recommendation on the Ethics of Artificial Intelligence"**, establishing global ethical frameworks for the development and use of artificial intelligence (AI). The recommendation emphasizes the necessity of protecting human rights as a central element in AI implementation, paying particular attention to privacy and data confidentiality as fundamental rights that must be respected.

In the context of medicine, the report accentuates the need for ethical design and use of AI in ways that respect human dignity, patient autonomy, and their right to informed consent. UNESCO calls for ensuring transparency of AI algorithms, which is crucial for building trust between patients and AI-based healthcare systems.

The report also highlights the risk of algorithmic biases and potential discrimination resulting from errors in training data. Additionally, the document underscores the importance of international cooperation in creating coherent legal regulations and ethical standards. It points to the need for harmonizing regulations to effectively manage AI development on a global scale, particularly in healthcare, where data and technologies often cross national borders.[31]

OECD

The **Organization for Economic Cooperation and Development (OECD)** in 2019 adopted a set of five principles aimed at promoting responsible and trustworthy use of artificial intelligence (AI). These principles emphasize the importance of respecting human rights, the rule of law, democratic values, and diversity. Key postulates include ensuring that AI systems bring social benefits and are designed to promote inclusion and sustainable development. The OECD highlights the need for transparency and explainability of AI algorithms so users can understand their operation and decisions. Furthermore, the principles emphasize the responsibility of AI creators and users for its operation and the necessity of establishing mechanisms of accountability and oversight over AI systems.[32]

European Commission

The **White Paper** published by the European Commission in February 2020 presents the European Union's strategy for promoting the development and implementation of artificial intelligence (AI) in a way that ensures both technological excellence and social trust.[33]The document emphasizes the importance of two key pillars: an **ecosystem of excellence** and an **ecosystem of trust**. The focus is on increasing investments in AI research and development and supporting education and training in this field, as well as creating appropriate regulatory frameworks to ensure that AI development and use align with EU values and fundamental rights.

The White Paper also underscores the importance of international cooperation regarding AI standards and norms and the need to ensure interoperability and compliance with

[31]UNESCO, 2021, *Recommendation on the Ethics of Artificial Intelligence,* online: https://unesdoc.unesco.org/ark:/48223/pf0000380455
[32] https://www.oecd.org/en/topics/ai-principles.html
[33]White Paper on Artificial Intelligence - A European approach to excellence and trust, https://commission.europa.eu/document/download/d2ec4039-c5be-423a-81ef-b9e44e79825b_pl?filename=commission-white-paper-artificial-intelligence-feb2020_pl.pdf

regulations of other jurisdictions. The Commission highlighted that healthcare is one of the sectors with the highest risk in the context of AI applications, due to the potential impact on patients' lives and health and the necessity of processing sensitive personal data.

United Nations

At the international level, numerous initiatives aim to promote new technologies, including the development of artificial intelligence. Noteworthy is the **"AI for Good"** initiative organized by the **International Telecommunication Union (ITU)**, a specialized agency of the United Nations responsible for issues related to information and communication technologies. Launched in 2017, the initiative aims to accelerate the development and implementation of AI-based solutions to address global challenges, particularly those related to the United Nations Sustainable Development Goals (SDGs).[34]

Beyond various research fields, the initiative also focuses on healthcare, promoting ethical and responsible AI applications to improve medical diagnostics, patient care, and disease prevention. It simultaneously emphasizes the importance of privacy protection, data security, and ensuring equal access to technological innovations.

The above represent some of the many legal acts and initiatives taking place globally. Issues related to the effective use of AI continue to gain prominence.

CONCLUSIONS

The development of artificial intelligence (AI) in healthcare brings the promise of revolutionary changes in diagnosing, treating, and preventing diseases. Its applications—from analyzing medical images to personalized therapy and remote patient monitoring—highlight the enormous potential of this technology in improving the quality and efficiency of healthcare. However, introducing AI into medicine brings significant ethical and legal challenges that require in-depth analysis and attention.

Conclusions from the analysis indicate that the key to effective and ethical use of AI in healthcare is balancing technological innovations with respect for patient rights and bioethical principles. It is necessary to further develop international standards, invest in data infrastructure, and educate both medical personnel and patients about AI technologies.

Given the rapid technological progress and changing social and legal realities, it is impossible to exhaust this topic in a single article. Continuous monitoring, research, and international discourse are required. Only through coordinated actions and open dialogue will it be possible to fully harness the potential of AI in medicine while ensuring the protection of patient rights and compliance with ethical principles.

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Section A

EVOLVING LEGAL RESPONSES TO STALKING AND SEXUAL HARASSMENT: A GLOBAL PERSPECTIVE

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Abstract

The aim of the paper is to study the phenomenon of stalking and sexual harassment, which, from being an invisible "private problem," has gained the focus of a "public phenomenon" worthy of the attention of the global scientific community. The change in the perception of this phenomenon is accompanied by changes in legislative solutions. The paper begins by examining the causes of its emergence and presence throughout different periods. The paper presents several global and domestic studies and, through the obtained results, explains the reasons for its occurrence, risk factors, and typology of violent relationships. The research method involves reviewing current legal practices, analyzing psychological factors that contribute to stalking behavior, and exploring the barriers victims face in reporting such incidents.
The article examines international legal standards and domestic legislation with a focus on prevention. One chapter of the paper is dedicated to a comparative analysis of legislative solutions from several European countries and Western Balkan states. In the conclusions and recommendations for strengthening protective measures against stalking and sexual harassment, improvements, corrections, and changes in several segments are proposed to develop a strong strategy for the prevention and protection against stalking and sexual harassment.

Keywords: stalking, sexual harassment, legal system, victim, Istanbul Convention.

INTRODUCTION

Many victims of sexual harassment or stalking endure silent suffering. Women who experience these breaches are most affected by this silence since they frequently hesitate to ask for assistance from authorities or support groups. Such experiences have an impact that extends well beyond the present, influencing how people handle their relationships and day-to-day lives. Targeting and harassing people have changed in the digital age.

While social media and messaging applications have helped people interact, they have also provided harassers new means to keep tabs on and get in touch with their targets. For those who are exiting violent relationships, this reality is particularly harsh because they frequently find themselves being followed by their ex-partners both offline and online. In line with Article 34 of the Istanbul Convention, "stalking" often consists of constant monitoring and establishing unwanted communication with another person. In addition to physical stalking, it can also manifest as virtual stalking, demonstrated as stalking a person on social media, attempting to establish contact through telecommunications, or other means of communication.

Women are particularly vulnerable to stalking after leaving an abusive partner. Therefore, it is thought that special programs for the protection of victims who want to leave or have already left their relationship should be developed using scientific expertise in this area.

Following the signing of the Istanbul Convention and the necessity to conform to European law, our nation's criminal code has undergone a number of revisions. The Law on Amendments to the Criminal Code, Official Gazette of the Republic of North Macedonia no. 36 from 17.02.2023, contains the most important of these alterations. It added the criminal offenses of "Stalking" under Article 144-a, and "Sexual Harassment" under Article 190-a.

Despite significant legal frameworks and societal efforts to address stalking and sexual harassment, these issues persist at alarming rates. The prevalence and impact of stalking and sexual harassment remain underreported and under-addressed, leaving victims without adequate support. The question that drives this research is: *How can we better understand the societal, psychological, and legal implications of stalking and sexual harassment, and what strategies are most effective in addressing and preventing these behaviors?*

This study aims to explore the scope and impact of stalking and sexual harassment, focusing on understanding the psychological toll on victims, examining current legal responses, and identifying gaps in support systems.

The objectives of the research are:

- To analyze the psychological and emotional effects on victims of stalking and sexual harassment.
- To evaluate the effectiveness of current legal frameworks and societal responses.
- To identify challenges in reporting and addressing these behaviors and propose solutions to improve prevention and intervention strategies.

Understanding the impact of stalking and sexual harassment is vital for improving victim support, legal protection, and societal awareness. By identifying gaps in existing literature and legal frameworks, this research will contribute to enhancing the societal response to these issues. The findings could inform public policy, workplace practices, and social movements aimed at protecting individuals from these harmful behaviors and promoting safer environments in personal, professional, and digital spaces.

Literature review

The topics of sexual harassment and stalking have been thoroughly examined in a number of academic fields, such as law, criminology, and psychology. Studies regularly show that victims of these activities suffer grave psychological and social repercussions.

Psychological and Emotional Effects: Previous research shows that post-traumatic stress disorder (PTSD), anxiety, despair, and dread are frequently elevated in victims of sexual harassment and stalking (Sheridan & Grant, 2007). Significant emotional anguish is reported by women in particular, which has an impact on both their personal and professional lives. According to Fisher et al. (2002), stalking can have long-lasting psychological effects, with some victims turning to social disengagement and hypervigilance as coping strategies.

Digital Stalking and Harassment: As technology has advanced, cyberstalking has become more common, enabling criminals to track and harass their victims online (Javid & McFarlane, 2016). Because it invades victims' personal places and instills a lingering sense of anxiety, research shows that digital stalking can be just as upsetting as physical stalking (Tokunaga, 2010). Because of the anonymity of online harassers, victims of cyberstalking sometimes feel helpless, which complicates legal involvement.

Legislative Frameworks and Social Reactions: The efficacy of legislative safeguards against sexual harassment and stalking has been the subject of numerous studies. Although the 2011 Istanbul Convention underlined the necessity of more robust legal frameworks to safeguard victims, enforcement is still uneven (Lynch & Ciclitira, 2012). Although many nations have laws that make stalking and sexual harassment crimes, research indicates that their efficacy is nevertheless hampered by implementation flaws and victim assistance issues (Brekke & Landau, 2015). Because of social shame, a lack of faith in law enforcement, and fear of reprisals, victims frequently hesitate to disclose these crimes (Brodsky & Kieffer, 2009).

Underreporting and Victim Barriers: Although research admits that sexual harassment and stalking go unreported, little is known about the particular obstacles victims encounter when attempting to obtain legal or psychological support. Improving victim support services and legal actions requires an understanding of these obstacles.

Frameworks and Social Reactions: The efficacy of legislative safeguards against sexual harassment and stalking has been the subject of numerous studies. Although the 2011 Istanbul Convention underlined the necessity of more robust legal frameworks to safeguard victims, enforcement is still uneven (Lynch & Ciclitira, 2012). Although many nations have laws that make stalking and sexual harassment crimes, research indicates that their efficacy is nevertheless hampered by implementation flaws and victim assistance issues (Brekke & Landau, 2015). Because of social shame, a lack of faith in law enforcement, and fear of reprisals, victims frequently hesitate to disclose these crimes (Brodsky & Kieffer, 2009).

Stalking After Divorce: Research indicates that women who leave violent marriages are more likely to experience stalking from their former partners (Logan et al., 2006). Such stalking frequently combines digital and physical surveillance.

It can be challenging for victims of this type of stalking to break free from their abuser's grip because it frequently combines digital harassment with physical observation. According to research, stalking after a breakup can have terrible psychological impacts and, if left unchecked, can turn violent (Melton, 2007).

METHODS

The research is transversal in type, time-dimensional, exploratory with a predominance of the descriptive method, analysis and synthesis, induction and deduction. Several methods will be used to provide a more specific answer to the problematic questions that will be raised, and

through analysis, conclusions will be reached. The comparative method will serve to analyze the criminal legislation and measures of protection against stalking and sexual harassment in our country and in some countries in the world, in Europe, in the Balkans and in the neighborhood. The descriptive method will find application in explaining what is set as a common problem, as well as in introducing measures and instruments of prevention. The normative method will be used in analyzing the domestic legal framework and the practical application of the legal mechanisms of judicial protection.

The research methods used in the scientific article are:

• historical-legal method – enables the analysis of the causes of the occurrence and development of the phenomenon of stalking and sexual harassment;
• comparative method - represents a comparative study of international legal regulation, the regulation of neighboring countries and the countries of the Western Balkans and will process foreign positive - legal solutions in comparison with the legal regulation of the Republic of North Macedonia;
• synthetic method – will be applied to draw specific conclusions from the analyses made;
• induction method – enables the drawing of general conclusions from individual analyses and observations;
• the logical method and interpretation – will be applied in the analysis of the legal regulation of the Republic of North Macedonia as well as the legal regulation of certain European and Balkan countries;
• the case study method – will enable the presentation of case law from Macedonian courts and international courts.

Stalking

Stalking is defined as deliberate behavior of repeatedly threatening another person that causes the person to fear for their safety. (Article 34, Council of Europe Convention on preventing and combating violence against women and domestic violence, 2011)

The penalty for stalking includes a fine or imprisonment of up to three years for anyone who repeatedly and without authorization follows, harasses, or otherwise interferes with another person's private life, or attempts to establish or establish unwanted contact with them through physical movement in the space where they are, abuse of personal data, use of public media or other communication methods, or other ways of psychologically tormenting, harassing, or intimidating them, causing them to feel insecure, distressed, or afraid for their safety or the safety of someone close to them. If the offense is committed against a person with whom the offender has or had an intimate relationship, or against a child, the penalty is from six months to five years.

The law also provides for a prison sentence of up to one year for the offense of sexual harassment, whether it is verbal or physical. The actions that constitute the offense include: following, harassing, interfering with someone's personal life, attempting to establish unwanted contact, misuse of personal data through various media, harassment, intimidation, and threatening. These threats must be serious and objectively capable of causing insecurity, distress, and fear for the victim's or their close relatives' safety. Stalking involves the use of a serious threat to harm the victim's life or body, or the life or body of someone close to them. This

criminal act, as a "delict - obstacle," can lead to other "sexual offenses" or acts that violate the physical and mental integrity. (Tupanchevski and Deanoska 2023, 103)

The severity of the threat causing fear must be assessed by an objective criterion, considering the specific circumstances of the case. The intent of the perpetrator to actually carry out the threat is irrelevant. That is, the act exists even when the perpetrator had no intent to carry out the threat at the time of committing the act, or when the means of threatening are inappropriate. (Kambovski and Tupanchevski 2011, 108–110)

The mens rea or desire for the consequences characterizes this crime. The qualified forms of the crime apply when the offense is committed against a person with whom the perpetrator has or had an intimate relationship, or when it is committed against a child. This refers to the current or former intimate partner of the passive subject as the perpetrator, regardless of whether the relationship was marital or non-marital, familial, or another form of relationship. The focus is only on the "intimacy" of the relationship, which can lead to a correlation with the consequences of the criminal act.

There are several forms of committing the criminal offense of "Stalking":

- Abuse of personal data;
- Use of public media or other communication methods;
- Other forms.

Professors Tupanceski and Deanoska argue that violations of privacy, surveillance, eavesdropping, recording, photographing, etc., as outlined in certain analyses and studies, are accompanied by other actions that cause fear and insecurity in people, leading to a high degree of violation of security. Stalking represents a form of domestic violence, closest to psychological abuse, and is characterized by specific features that make it a separate criminal offense. (Tupanchevski and Deanoska, 2023, 105)

Stalking is a form of domestic violence, closest to psychological violence. It is accompanied by special characteristics of stalking that make it a special incrimination. (Nikolić-Ristanović and Kovačević Lepojević, 2007, 3–12)

Sexual Harassment

The Law on Amendments to the Criminal Code, Official Gazette of the Republic of North Macedonia no. 36 from 17.02.2023, also introduced a new criminal offense, sexual harassment under Article 190-a. The legislator stipulates that anyone who, through verbal, non-verbal, or physical actions, or by using electronic communication tools that have a direct or indirect real or symbolic meaning of proposition, indecent offer, enticement, expressing sexual "appeal" or other actions clearly reminiscent of sexual intercourse or other related sexual acts, and thus violates the dignity of the victim, causing discomfort, offense, humiliation, or fear, shall be punished with a fine or imprisonment of up to one year.

Sexual harassment manifests in several forms, whether verbal, non-verbal, or carried out through electronic communication tools. The common feature of all is the intent to proposition, make an indecent offer, entice through the expression of sexual passion, or engage in actions that resemble a sexual act. The intent of the perpetrator is to violate the dignity, cause discomfort, offense, humiliation, or fear in the victim. Although defamation and insult were decriminalized by the adoption of the Law on Civil Liability for Defamation and Insult, the description in

Article 1 of Article 190-a of the Criminal Code suggests that any act leading to the "offense" of the victim is punishable.

It is unclear whether this is an editorial mistake or if the elements of criminalizing insult are being reintroduced. All sexual suggestions, whether open or hidden, that cause sexual harassment, are covered by the new legal provision. The more severe form occurs when the act is committed against a person subordinate to the perpetrator or a person dependent on them, such as in the workplace or public space, or when the victim is vulnerable due to age, illness, disability, drug addiction, pregnancy, or severe physical or mental impairments. For such an offense, the punishment is imprisonment from six months to three years. The legislator's intent is clear in addressing numerous discriminatory relationships that cause sexual harassment and are related to dependency, making them harder to criminalize.

The object of protection in this offense is the right to personal sexual freedom and peace as part of the body of other freedoms and rights guaranteed by law. The victim, who is the target of the perpetrator, becomes distressed by the sexual act or the suggestion of such an act.

Comparative Analysis

The comparative analysis of the definitions of "stalking" and "sexual harassment" confirms almost identical provisions in several European countries. Croatia is a leader in the Balkans, having first introduced the offense of "imposing behavior" in its criminal code, which is the equivalent of the criminal offense "stalking" in Macedonian law. According to the Croatian Criminal Code, (Kazneni zakon 2011) the offense is committed by someone who attempts or succeeds in establishing contact or otherwise threatens another person, causing them distress or fear for their safety, or the safety of their loved ones. This offense is punishable by imprisonment of up to one year. The more severe form, like in the Macedonian Criminal Code, punishes the offense when committed against a current or former spouse or partner, or a child, with imprisonment of up to three years. Similar is the case in Italy and Germany, where stalking is criminalized with varying degrees of punishment.

Italian law provides that anyone who repeatedly disturbs or threatens another person, causing serious distress or fear, or causing a reasonable fear for their safety or that of a close person, is punishable by imprisonment from six months to five years. A higher penalty applies if the offense is committed against a spouse or former spouse, someone in a close emotional relationship, or a child, or if it is done through computer or electronic systems.

German law has introduced a broader and more comprehensive definition of the offense "Stalking," which provides for punishment with imprisonment up to three years or a fine for anyone who unlawfully stalks someone by seeking proximity or attempting to establish contact via telecommunications or other means of communication or threatening harm to the victim or their loved ones. (German Criminal Code, 1998).

Based on the definition of "stalking," Macedonian legislation closely aligns with Croatian and German law, and in terms of penalties, it is similar to the Italian criminal code. It is suggested that amendments to the legal text should be made, particularly in terms of the severity of the penalties, which currently seem excessively strict and high for this criminal offense, making them difficult to apply in practice.

Stalking is sanctioned in different ways in many countries, with the United States devoting the most attention to it. The definitions vary, and the codes criminalize it even without physical harm or damage occurring. The broadest definition of stalking is provided by the National Center for Victims of Crime in the U.S., which views any unwanted contact between two people as a threat or something that places the victim in a state of fear. This definition includes cases of domestic violence even when no physical injury or harm is involved. (Stimmel, Stimmel, and Roeser, "Stalking: The Basic Law and Remedies)

The term "stalking" refers to any unwanted contact between two individuals that may represent a threat or put the victim in a state of fear. According to it, stalking exists even without consequences in the form of physical injury or damage of that kind. Essentially, stalking represents repeated behavior directed toward a specific person that would cause fear in any reasonable individual. It is also noted, for example, that: "Annually, around 7.5 million residents of the U.S. are subject to stalking; 15-20% of women in the U.S. and 6% of men have been victims of stalking at some point in their lives, when they felt serious fear that they or their loved ones would be harmed or killed. More than half of the victims were stalked before reaching the age of 25." The same document also presents alarming data on the connection between stalking, stating that 76% of murdered women were victims of stalking before their murder, and 54% of femicide victims reported stalking to the police before being killed by their stalkers, while almost 90% of femicide victims who were murdered had been physically attacked before the murder. Also, they were stalked approximately one year prior to the murder. (Stimmel, Stimmel, and Roeser, "Stalking: The Basic Law and Remedies)

In the spirit of Article 34 of the Convention, "stalking" most often consists of constant following and establishing unwanted communication with the other person. Besides physical stalking, it can also be virtual, demonstrated as stalking a person on social networks with attempts to contact them through telecommunication or other communication means.

Previous research confirms that women are especially at risk of stalking after leaving an abusive partner. Therefore, we believe that scientific knowledge in this area should be used to create special protection programs for victims who intend to or have left their partner. (National Center for Victims of Crime, Stalking Factsheet, 2015)

It can be observed that our legal system is very slow and ineffective in dealing with all forms of domestic violence. (Nikolić-Ristanović, Vera, and Maja Petrović, 2010, 76). For a long time, "stalking" was not sanctioned in the normative system. Probably because it occurs when one partner does not trust the other, becomes pathologically jealous, starts following their every move, checking social media, interrogating about every conversation and meeting, checking their mobile phone, reading their messages, and even using lie detectors and installing surveillance devices. (Landeka, N., 2017) The psychological pressure exerted by the person stalking their partner becomes unbearable, and it often occurs due to mental disorders and pathological narcissism present in paranoid and schizophrenic personalities. Victims are forced to report to the police, file private criminal charges, request temporary measures, and take other legal actions for protection. However, unfortunately, legal practice still lacks positively applied material law in this area, which would allow for its efficiency to be elaborated.

In modern life, due to the global accessibility of various informational platforms and social networks, various abuses of personal data can lead to psychological abuse, harassment, or intimidation.

Understanding Stalking and Sexual Harassment: Notable Cases

To better understand the real-world impact of stalking and sexual harassment, it's essential to look at some notable cases that have highlighted the severity and pervasiveness of these issues. These cases shed light on the various forms stalking and sexual harassment can take, as well as the profound emotional and psychological toll they have on victims. Below are some notable cases that have brought attention to these serious matters:

Cases of Stalking

1. **The Case of Rebecca Schaeffer (1989)**

One of the first prosecuted cases of "stalking" that stirred American public opinion is the case of Hollywood star Rebecca Schaeffer. Her role in the television series *My Sister Sam* had a massive viewership. Due to the show's plot and the young actress's attractiveness, she became a victim of persistent stalking by Robert Bardo. He became obsessed with the actress after seeing her photo in a magazine, then began watching the series daily and analyzing his victim. Bardo started sending her letters, which she initially ignored, while stalking her every move and seeking ways to contact her. He managed to sneak into her home and leave her a gift. The actress sought protection from the police, but the stalker was so relentless and always one step ahead of her. Ultimately, he shot her in front of her home in Los Angeles. Due to public pressure and reactions, the codification of the crime of stalking began in American legislation. (American Prosecutors Research Institute, 1997)

2. **The Case of Karen and Online Stalking (2015)**

One of the most well-known cases of online stalking is that of Karen (2015). Her ex-boyfriend, a savvy user of modern technology, began cyberstalking her. The twenty-year-old girl started receiving numerous text messages and phone calls. Initially, they were not threatening but merely disturbing, so she did not pay much attention. Soon, the stalker became obsessed with his ex-girlfriend and harassed her in various ways constantly. He managed to create multiple fake social media profiles to stalk and disturb her. By analyzing her profiles, he was able to track her activities and knew where she was located. Additionally, he installed spyware on her devices, which allowed him to monitor her online activity and even locate her via GPS. As a result of having accurate information about when and where she was, he unexpectedly showed up at her workplace. Karen immediately sought police protection, which was ineffective due to the absence of legal standards for protection against online stalking. Following the prosecution of this case, the need for legal norms to protect against digital stalking became prominent. (Herman, 2016)

Cases of Sexual Harassment

1. **The Case of Michelle Vinson v. Meritor Savings Bank (1986)**

The case of Michelle Vinson is one of the first that brought public attention to workplace rape and sexual harassment. She was compelled to report her former supervisor, Sidney Taylor. The Supreme Court determined that the sexual harassment Michelle Vinson experienced in her

workplace constituted a violation of Title VII of the Civil Rights Act of 1964. This statutory provision prohibits discrimination based on sex in the workplace. The decision made by the Supreme Court became a source of law and a precedent applied in cases of workplace sexual harassment. (Courtney, 1987)

2. **The Harvey Weinstein Scandal (2017)**

The entertainment industry is often a place where victims are targets of sexual harassment. One of the most well-known cases is related to the sexual abuses committed by Hollywood producer Harvey Weinstein. Dozens of women, including prominent actresses Ashley Judd, Rose McGowan, and Gwyneth Paltrow, accused Weinstein of sexual harassment and abuse of power. The case became a global sensation and was essentially a catalyst for the #MeToo movement. In 2020, as a result of numerous allegations of sexual assaults from multiple women, Weinstein was sentenced to a long prison term. (Lins, Roth, Servaes, Tamayo, 2021)

3. **The #MeToo Movement and the Silence Broken (2017-2018)**

The #MeToo movement raised awareness among victims and encouraged them to report instances of sexual violence and harassment, leading to their prosecution. This movement became globally popular and encouraged many victims to seek prosecution for cases of sexual violence. It also resulted in improvements and strengthening of the legal system's protection for victims of such violence. (Bhattacharyya, 2018)

The above cases are evidence of the failure of institutions to address newer types of criminal acts in legal history, such as stalking and sexual harassment. They are characterized by the inventiveness in the methods employed by numerous perpetrators who stalk or harass victims from every angle. Perpetrators less frequently use traditional forms of harassment because modern digital technologies allow them to stalk and harass unnoticed. They hide behind fake social media profiles, using false names and pseudonyms just to get closer to their targeted victim. While stalking is most often carried out by former partners, the described cases confirm that it can also be perpetrated by strangers. The most common victims are public figures due to the nature of their profession, whose lives are exposed to public scrutiny. It is also confirmed that anyone can be stalked and harassed at work, either by colleagues or by supervisors. Therefore, legal reforms are needed for more effective protection against stalking and harassment in the workplace. The widespread #MeToo movement is proof of the power of collective action in the fight against these harmful behaviors. The goal is to create a society where individuals can live without fear of harassment, whether physical or digital, and where perpetrators are held accountable for their actions.

North Macedonia has encountered significant cases of stalking and sexual harassment, particularly in the digital realm. A notable incident is the "Public Room" scandal, where explicit photos, personal data, and child pornography were shared without consent in a Telegram group with over 7,000 members. This case highlighted the challenges authorities face in addressing online harassment and sexual violence. (Stevanovic, Risteski, Skara, 2021, 3-5)

The case involves a larger group of women and girls who were victims of sexual harassment online, i.e., whose private photos and videos were published and shared with a larger group of men without their consent in a closed group on the Telegram social network called "Public Room". The group was founded and administered by several men, and in the meantime,

new members are being added to the closed group. The group shares personal photos and videos of women and girls or photos taken from their social networks and shared with their personal contacts with harassing and sexist comments. The case emerged in January 2020, when the Ministry of Internal Affairs announced that the group had been closed. In January 2021, the media again reported that the Telegram group Public Room was still active and that photos, videos, phone numbers and other data from women and girls were continuously shared in it. In April 2021, the Public Prosecutor's Office filed charges against the creator and administrator of the Javna soba group, charging them with the crime of "production and distribution of child pornography", after which in March 2022, the Basic Criminal Court issued a verdict sentencing the defendants to four years in prison. (Tuneva, Boskova, 2023)

In response to such incidents, North Macedonia has amended its Penal Code to criminalize stalking and online harassment. These legal reforms aim to provide better protection for victims and hold perpetrators accountable.

Despite these legal advancements, challenges persist in effectively combating online sexual violence. Activists emphasize the need for comprehensive implementation of laws and increased awareness to prevent such offenses.

These developments underscore the importance of continued efforts to address stalking and sexual harassment in North Macedonia, both online and offline.

What is controversial about the case law?

The criminal offense of "Stalking" is also incriminated in the European Convention on Human Rights and is defined as obsessive behavior of one person or group towards another person, causing fear for his or her safety. The Convention clarifies the term "obsessive behavior" which in this case consists of constant monitoring and establishing unwanted communication with the other person.

The Convention characterizes stalking as physical stalking, i.e. following the other person, and as virtual stalking, i.e. on social networks. In the article in the Macedonian Code, a controversial issue that could cause dilemmas in the case law is that action is required within a "certain period of time", say some judges.

According to Judge Gabriela Gajdova from the Basic Court in Veles, who has already held trainings on this topic, the question is how much effective time needs to pass before it can become a criminal offense of stalking.

"Based on the linguistic interpretation of the above formulation, it follows that a long period of time measured in years is not required. On the contrary, it seems that the above formulation allows for this crime to exist even when the actions are taken in a significantly shorter period, such as a few months." (Gajdova, 2023)

However, according to Gajdova, the most interesting situation, in terms of whether the time condition is met, exists in the case if the action is committed over a period of several hours, days or weeks in continuity. It should be born in mind that in today's way of life, people's sensitivity has increased and they become very easily agitated, so it is difficult to accept that taking actions only over a period of a few hours could qualify as stalking.

"This could only be the case if the victim was exposed to hundreds of threatening or harassing messages via telephone or email during those few hours." (Gajdova, 2023)

However, if the actions were carried out and continued for several days or weeks in a row, it should be considered that stalking exists, considering that this is a completely sufficient period of time that can be treated as persecution of the victim. An action that is taken only once or if there is no time continuity between two actions taken, is not considered to be the commission of the crime of "stalking".

The Convention on the Protection of Human Rights obliges authorities to act promptly in such cases, as soon as they become aware of a case. It focuses in particular on the fact that investigative authorities must react with particular vigilance when conducting an investigation.

The introduction of the criminal offence is very beneficial for the parties. The reason for this is that until now, justice could only be sought in civil proceedings, and the perpetrators were not held criminally liable. This meant that there was neither a fine nor a prison sentence, but victims received protection that was limited in time from 6 to 12 months, and perpetrators often violated the bans because they had no criminal repercussions.

Otherwise, the closest offence to "stalking" in our Criminal Code is endangering security because there may be overlaps. The main difference is that in stalking, several actions must be repeated more than once, while in endangering security, the threat can only be made once and is against the life and body of the victim or their loved one.

But both are intentional, meaning that the perpetrator is aware and knows that they can harm the victim. The motives are also different, with stalking the motive is personal obsession, revenge, control, while in security threats it is most often financial gain, ideological beliefs or political agendas.

CONCLUSION

The results of this study also point to a number of directions for further investigation. Knowing the precise nature of the connections between stalking and sexual harassment that have been proposed, as well as investigating the frequency of these occurrences and how they are perceived, would be advantageous for increasing awareness and improving the effectiveness of prevention strategies both inside and outside of an intimate partner violence context. The results of this study imply that, as technology develops, research may also need to focus on cyberstalking because there are more and more opportunities for these kinds of behaviors online. Lastly, as evidenced by current data, more research is required to fully understand how gender assigned at birth affects both sexual violence and stalking. Furthermore, there is growing pressure for research to examine how gender constructs may influence sexually violent behaviors and stalking, as well as to be more inclusive of those who identify as non-binary. Crucially, without greater awareness in the community that victims are encouraged to seek help, little change is likely to occur.

Future research could develop the mental health recovery model for stalking victims of all categories, including sexual and relational aspects of health. More importantly, sexual reorganization, relational fatigue, and a healthy past psychosexual value system are protective factors of overall recovery. Until specialized services extend their expertise to stalking victims, mental health professionals should make sure that the audit trail of victims remains intact so that clinical interventions can follow the victim throughout their journey. Future development and

validation of a patient sexual safety checklist will act as important clinical frameworks for psychological interventions and patient safety. The organization needs to develop a family of psychosexual policies with modifications to existing training in this area of personal vulnerability.

Future studies will focus on creating and approving a full range of psychosexual policies that shield patients from sexual predators, encourage healthy sexual behavior and close relationships, deal with the censorship of multimedia content and devices, and provide advice on how to avoid stalking. Furthermore, a sexual safety checklist must be created and validated. Future improvements to the current recovery programs may contribute to the creation of a safe space for stalking victims to share their stories.

In summary, studies have shown stalking and sexual harassment to be a serious social issue and have detailed some of the traits of stalkers, their actions, and the circumstances in which stalking takes place. Now, a more methodical approach is required. Research that could help society better detect stalking and sexual harassment, create strategies for treating stalkers, and create techniques that could help catch stalkers early before they hurt the victim

If our country takes into account the positive obligations imposed by the ECHR and the indications of the need for adequate protective mechanisms against existing and new (cyber - types of stalking and sexual harassment), by applying scientifically and legally based solutions and postulates, with synergy in the decisions of all relevant institutions, it will be able to develop a strong strategy for prevention and protection against stalking and sexual harassment.

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Section B

ENHANCING QUALITY AND EXTENDING SHELF LIFE: THE ROLE OF ϒ-IRRADIATED BLACK PEPPER (PIPER NIGRUM) IN MORTADELLA PRESERVATION DURING COLD STORAGE

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Abstract

The aim of this study was to assess the impact of incorporating ϒ-irradiated black pepper (Piper nigrum) at the maximum approved radiation dose of 10 kGy on the quality characteristics and shelf-life of sliced mortadella bologna-type sausage (IBP) stored at 4 ± 2 °C for 21 days in vacuum packaging. The sterility of the black pepper grains was confirmed using the standard

microbiological agar plate method, revealing < 0.01 log cfu/g microbial activity, a state maintained after the pepper's addition at 1.5% of the total sausage mass. This led to an extended lag phase in microbial growth within the IBP samples during storage, positively influencing various sensory and biochemical parameters. Statistically significant improvements ($p \leq 0.05$) in hardness and color intensity were observed by the 14th day, enhancing overall appearance and resulting in lower TVB-N values due to decreased microbial activity. These findings suggest that ϒ-irradiated black pepper can enhance the quality and extend the shelf-life of mortadella bologna-type sausages during cold storage in normal atmosphere packaging.

Keywords: ϒ-irradiated black pepper, mortadella bologna type sausage, quality characteristics, cold storage shelf-life.

INTRODUCTION

Hot-cured sausages constitute a significant portion of the meat products in the European market, particularly in the Western Balkan countries. Among these, mortadella is recognized as a high-quality product. It is well established that during shelf life, changes occur in sensory, biochemical, and microbiological characteristics Fernandez-Lopez et al., (2003); (2005); Indzhelieva et al., (2015). Among chemical indicators, biogenic amines—particularly putrescine and cadaverine—have been proposed as markers for determining meat quality Ivanov et al., (2016). These processes of quality deterioration significantly reduce the nutritional value of sausages Dragoev et al., (2016). Additives used in the processing of meat products, such as nitrates and nitrites, can delay rancidity Rysha et al., (2021).

The primary microorganisms present in raw meat and meat products include aerobic bacteria such as Pseudomonas spp., Bacillus spp., and facultative anaerobes like Escherichia spp., Brochothrix spp., Lactobacillus spp., Salmonella spp., and Staphylococcus spp. Viuda-Martos et al., (2010). The presence of these undesirable microorganisms can lead to serious foodborne illnesses, posing significant health risks to humans. Additionally, they can cause the production of ammonia, trimethylamine (TMA), and dimethylamine (DMA) in spoiled meat Cai et al., (2011).

Lipid oxidation is one of the most critical issues affecting the chemical deterioration of meat during cold storage Choe & Min, (2009). It leads to a decline in quality characteristics, reviewed through a multistage system perspective, beginning with a decrease in nutritional properties, including the loss of essential fatty acids, which can negatively impact sensory characteristics and cause deterioration in flavor, texture, and color Pratt et al., (2011).

In response to these challenges, the meat industry continuously works on developing effective additive combinations to ensure product safety while also striving to enhance the nutritional and quality characteristics of processed meat products Doménech-Asensi et al., (2013).

ϒ-ray irradiation of food is emerging as a potential solution for pre-treating additives in processed meat products Suhaj, (2006). The primary expectations from these pre-treatments include reducing microbial growth and extending the lag phase, which in turn can result in an extended shelf life of meat products.

Irradiation is an effective form of food preservation that prolongs shelf life and reduces spoilage Saeideh et al., (2021). It can be achieved using low-dose, medium-dose, or high-dose levels of radiation. Low-dose irradiation (<2 kGy) is used to delay the aging of vegetables and fruits; medium-dose irradiation (between 1 and 10 kGy) is used to reduce the levels of pathogenic organisms, similar to pasteurization; and high-dose irradiation (>10 kGy) is used to achieve

sterility Morehouse & Komolprasert, (2004).

The Directive 1999/3/EC states that foods and food ingredients from an established list (covering 25 countries) can be treated with Ɣ-rays with a maximum absorption of up to 10 kGy for dried aromatic herbs, spices, and vegetable seasonings. The FDA limit for culinary herbs, seeds, spices, vegetable seasonings, and blends of these aromatic vegetable substances is up to 30 kGy Code of Federal Regulation, (2004).

Based on this, the objective of the study was to evaluate the effect of gamma-irradiated black pepper (10 kGy) on the quality characteristics and shelf life of mortadella under household cold storage conditions (4 ± 2 °C).

MATERIALS AND METHODS

Twelve Experimental design. Research work in this article was divided in two main pillars. First the irradiation of whole black pepper grains was made and then the microbial analyses for evaluation of black pepper sterility was made.

The preparation of samples, precisely mortadella sausages was made in two groups. Control group (C) and experimental group (IBP) with total mass of 5 kg.

Manufacturing process was done on traditional way known for mortadella with just whole grains of black pepper.

Meat as percentage of 100%: contained 65% lean meat and 35% backfat; during emulsification meat never extended 2 °C, 15% water (ice w/w) was added and as Additives: 3% potato starch, 0.5% sodium ascorbate, 0.15% sodium nitrite, as Spices: commercial spices 1.5% and 15 grams (1.5%) whole black pepper grains.

Fat cubes and black pepper were added after emulsification phase and the whole mix was just stirred on low speed.

Mixture was filled in laminate polyethylene-polyvinyl dichloride sausage casings and thermally processed for 3 hours on 75–80 °C.

Next step was cooling with running water for one hour and then transferred into refrigerator for 6 hours, while the temperature decreases to 1 °C on the surface. The whole sausages where sliced and packed in a minimal vacuum sealing pressure of 5 mbar. Tabletop vacuum machine model VA-400 from Jiangsu Tengtong Packing Machinery Co., Ltd was used.

One difference between the control and experimental sample was the use of γ-irradiated black peeper in the experimental samples of mortadella.

Mortadella sausages were manufactured at Andonov dooel Sveti Nikole, North Macedonia.

Ɣ-irradiation and microbial analyses of black pepper grains. Irradiation is a non-thermal technique for decontamination.

For this study, samples of black pepper were obtained from the food processing factory AD Vitaminka Prilep, North Macedonia.

Samples were irradiated by 60Co γ-rays at absorbed dose of 10 kGy. The material was irradiated at the Vinča Institute of Nuclear Sciences, University of Belgrade (Belgrade, Republic of Serbia).

The conventional agar plate method was used as a standard microbiological method, in order to evaluate the effect of irradiation on TVC at black pepper samples in the laboratory of Ss. Cyril and Methodius University, Faculty of Technology and Metallurgy, Skopje, North Macedonia.

Sensory evaluation. Discriminative, or difference testing, methods were used to determine

differences in specific attributes like appearance, color intensity, shine, odor, acid taste, hardness and juiciness of mortadella using the Degree of Difference method with 5 points where 1 is very large difference from initial stage and 5 is no difference. This means that at the initial phase the grades were all 5 and during the storage they will decrease ASTM, (1986).

Preparation of samples for physicochemical analysis. Average laboratory samples were prepared by homogenization. From every group average laboratory sample was taken and then, the quantity required was calibrated, as described in the appropriate methods for research.

pH value was measured directly with the use of bevel needle pH electrode of digital pH meter BIOBASE Benchtop (PRC) pH/mV 210.

Acid value was measured using free fatty acids as an indication of hydrolytic rancidity of extracted fat according to the Bligh & Dyer, (1959) modified by Gheisari (2011). FFA in the fat extracted from a mortadella sample was determined by titration with a solution of 0.1 N potassium hydroxide (KOH) and with phenolphthalein as an indicator. The acid value (or free fatty acid content) was determined by AOAC method 940.28 AOAC, (2012).

Peroxide value POV was determined spectrophotometrically based on the oxidation of Fe^{2+} to Fe^{3+} in the presence of hydroperoxides and the formation of a colored complex between obtained Fe^{3+} and SCN as described by Hornero-Méndez et al., (2001). The absorbance at 470 nm was measured against the water blank sample (correction of the spectrum baseline at 670 nm was performed). The absorbance was measured by spectrophotometer SPUV 1000 DLAB (DLAB Scientific Co., Ltd. Beijing Airport Economic Core Zone, Shunyi District, Beijing 101318, China).

TBARS was determined using the method of (Botsoglou et al., 1994), following recommendations of Jebelli et al., (2012). A 2 g sample was transferred into a 25 mL centrifugated tube, and volumes of 5% aqueous TCA (8 cm3), and 0.8 mL BHT in hexane (5 cm3) were successively added. The content of the tube was Ulta-Turraxed for 30 s at high speed and centrifugated for 3 min at 3000 g, and the top hexane layer was discarded. The bottom aqueous layer was made to a 10 mL volume with a 5% TCA, and 2.5 cm^3 aliquot was pipetted into a screw-capped tube to which a volume (1.5 cm^3) of 0.8% aqueous TCA was added. Following incubation for 30 min at 70°C, the tube was cooled under tap water, and reaction mixture was submitted to third-derivative spectrophotometry against blank reaction mixture. Aliquots of standard solutions were pipetted into screw-capped tubes and diluted to 2.5 cm^3 volume with 5% TCA. A 1.5 cm^3 0.8% TCA was added in each tube and the reaction was carried out as prescribed. Calibration curves were constructing by plotting values of peak height at 521.5 nm were measured using single ray spectrophotometer SPUV 1000 DLAB (DLAB Scientific Co., Ltd. Beijing Airport Economic Core Zone, Shunyi District, Beijing 101318, China), as they are printed on the instrumental chart in arbitrary units, versus known concentration of MDA in the final reaction mixtures. MDA in samples was calculated using formula:

$$MDA = \frac{16 \cdot C \cdot V}{W} \mu g/kg$$

C is the MDA concentration (mg/cm^3) in the sample extracts according to the calibration curve,

V is a dilution factor of sample extract (cm^3) if any, and

W is the weight (kg) of the sample.

The total volatile basic nitrogen TVB-N was determined according to the method described by Goulas & Kontominas, (2005). The 5 g to 10 g of laboratory samples was measured. They, were put in distillation flask with 200 cm^3 of distillate water, to which were added litmus paper, 10 cm^3 of liquid paraffin, 2 g of magnesium oxide mixed with 25 cm^3 to 30 cm^3 of distillate water. The reaction needed an alkaline reaction (litmus paper supposed to be blue). The distillation

equipment which was used containing: steamer, distillation flask, Liebig condenser, and receiving flask. The 20 cm^3 to 30cm^3 of H_2SO_4 were put, and 3–5 drops of methyl rot as an indicator were added. After that the samples were titrated in the receiving flask with 0.1N NaOH until changing the color from red to yellow.

Microbiological analysis. Decimal dilutions were performed and 1 mL was removed from each dilution and cultured by the pour plate technique on plate count agar for mesophilic and psychrotrophic counts in triplicate according to the method of Ercolini et al., (2009). The total mesophilic aerobic bacteria count was incubated 72 h at 28 ºC. Psychrotrophic count (PTC) was determined in a similar method to that for TVC, except, plates were incubated at 7 °C for 10 days.

Statistical analysis. Obtained data was run in triplicate and results were reported as mean values ± standard deviation (SD). Data were subjected to analysis of variance (one-way ANOVA Excel 5.0). A p-value less than 0.05 ($p \leq 0.05$) was considered statistically significant.

RESULTS

Ɣ-irradiation of black pepper gave the expected results and at the microbial analyses sterility of black pepper grains was obtained. Similar results were obtained by Horvatova et al., (2007) who spotted significant differences in the antioxidant activity of black pepper grains irradiated with EU limit doses of 10 kGry.

First and very important, results in sensory evaluation showed that irradiation did not have unpleasant impact on aromatic components of black pepper and it is impossible to sense without detection methods Bayram & Delincée, (2004). These findings are in accordance with the obtained results of Balamatsia et al., (2006) who examined the effect of low-dose radiation on microbiological, chemical, and sensory characteristics of chicken meat stored aerobically at 4 °C. At, first day the highest scores were adopted. During storage examined indicators in sensory evaluation showed decreasing trend and at the 21st day of storage they were unacceptable.

Significant differences were detected at the 14th day (presented on Fig. 1 and Fig. 2 below) in favor of experimental sample for hardness and color intensity which led to significant score in overall appearance. We assume that significant differences in sensory parameters were caused due to higher presence of oxidation indicators like FFA and POV and we think that even bigger impact had higher TVB-N values and higher values of microbiological parameters that were obtained on the analyses of the 14th day of storage.

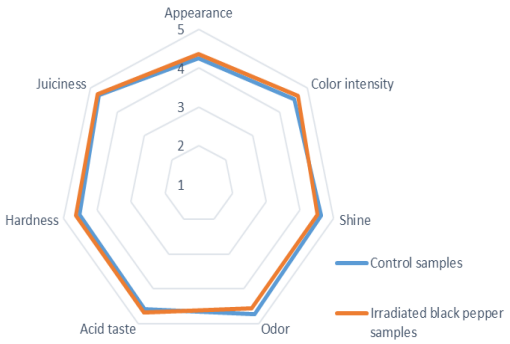

Figure 1. Sensory score at the 7th day of storage at 4 ± 2 °C

Figure 2. Sensory score at the 14th day of storage at 4 ± 2 °C

Similar results, regarding significance of sensory score in favor of mortadella's treated with different techniques for increasing antioxidant activity of ingredients and extending shelf life were reported by Thales Leandro et al., (2021); Lee et al., (2008); Kumar et al., (2015).

In mortadella, pH values ranged from 6.42 (initially) to 7.29 and did not show any pattern of increase or decrease (Table 1). The pH values of such products can be expected to be relatively high, attributable to presence of sodium additives Dutra et al., (2017). Values of FFA (a measure of fat status and quality) showed steady increase level during storage and they increased 0.41 to 3.48 at the end of storage for control samples and from 0.78 to 3.37 at the end of storage for IBP samples. This pattern might suggest use of FFA percentage as an analytical indicator to judge the fat quality of mortadella. Al-Abdullah (2004) obtained approximate results for FFA levels of beef and sheep mortadella.

Peroxide value showed increasing trend till the 14thday and reached 0.289 milliequivalents of active oxygen for control and 0.256 for experimental samples then decreased to 0.121 for control and 0.129 for experimental group at the end of cold storage on the 21st day. This variation in PV was due to Hydroperoxide formation is higher than decomposition; therefore, its accumulation in tissue, results with an increased peroxide value. When concentration is high following the breakdown into smaller molecules, the peroxide value decreases.

Absence of significance between samples can be explained because irradiation process does not have antioxidative effect and cannot have effect on primary lipid oxidation processes. Similar results were obtained by Dutra et al., (2017), they examined combined effects of γ-radiation doses and sodium nitrite content on the lipid oxidation and color of mortadella.

Malondialdehyde concentration showed steady increase throughout whole storage time in both samples without significant differences, reaching 0.88 and 0.94 mg/kg for control and irradiated samples respectively. TBARS results in our analyses differ compared to Abdel-Khalek, El-Aziz & Ibrahim (2022); Arshad et al. (2019); Islam et al. (2019); Ham et al. (2017); Li et al. (2017); Yan et al. (2024) who investigated lipid oxidative changes during storage of chicken and pork irradiated meat and detect significant changes in γ-irradiated samples. Our opinion is that γ-radiation of only the main spice black pepper it is not strong enough to cause undesirable changes of the lipid oxidation processes during cold storage of mortadella.

For estimating meat freshness or shelf-life, TVB-N as a product of microbial decarboxylase activity was investigated. TVB-N values showed higher significant differences in control sample on the 14th day of storage, but were below the recommended value of 40 mg N/100 g. In our study, increase of the total viable count were followed by subsequent increases of TVB-N content and many authors stated a clear relationship between the microbiological quality and levels of TVB-N formation Cilla et al., (2006); Bekhit et al., (2021).

Table 1. Analyses of physico-chemical parameters of whole mortadella sausage cuts stored for three weeks at 4 ± 2 °C

Examined Parameter	Day 1 Control sample	Day 7 Control sample	Day 14 Control sample	Day 21 Control sample	Day 1 IBP sample	Day 7 IBP sample	Day 14 IBP sample	Day 21 IBP sample
pH value	6.42^{a} ±0.04	7.13^{b} ±0.03	7.21^{c} ±0.05	6.91^{b} ±0.03	6.38^{a} ±0.05	7.09^{b} ±0.02	7.11^{b} ±0.04	6.97^{b} ±0.03
FFA (% oleic acid)	0.81^{ab} ±0.01	1.36^{ba} ±0.03	2.97^{ca} ±0.02	3.48^{d} ±0.04	0.78^{ab} ±0.02	1.23^{ba} ±0.04	2.85^{ca} ±0.03	3.37^{d} ±0.03
Peroxide value (mEq/O_2 g lipid)	0.027^{bc} ±0.01	0.111^{cb} ±0.01	0.289^{ac} ±0.02	0.121^{da} ±0.01	0.031^{bc} ±0.01	0.107^{cb} ±0.02	0.256^{ac} ±0.02	0.129^{da} ±0.02
TBARS, mg MDA/kg	0.13^{c} ±0.02	0.19^{ca} ±0.03	0.37^{cb}±0.03	0.88^{cd} ±0.04	0.14^{c} ±0.02	0.23^{ca} ±0.03	0.41^{cb} ±0.03	0.94^{cd} ±0.08
TVB-N (mg N/100 g sample)	12.32^{e} ±0.11	18.68^{ea} ±0.39	37.24^{*de} ±0.67	51.23^{eb} ±1.25	11.24^{e} ±0.13	16.79^{ea} ±0.35	28.92^{*f} ±0.61	47.35^{eb} ±1.17

*Data were expressed as Mean of three readings for each replicate (n = 3) ± SD. a, b, c, d, e, f - different letters indicated that values of the means in the same rows and columns are significantly different (*p < 0.05)*

The initial values of total viable counts TVC for mesophilic and psychrophilic microorganisms (presented on the Fig. 3 and Fig 4. below) started with 2.4 log cfu/g and 2.2 log cfu/g for experimental sample. Until seventh day of storage bacterial growth was lagging. Exponential growth started at eight day of cold storage and on the 14thday significantly higher values of 5.5 log cfu/g for control sample were obtained. Similar results for microbial status were reported by Almeida et al., (2015), who examined effect of jabuticaba peel extract on microbial stability of Bologna-type sausages during refrigerated storage. Although critical value of 5.7 log cfu/g was not exceeded in all samples, which was not case on the last day of storage where samples showed amounts above 7 log cfu/g. TVC results were in agreement with the obtained PTC results showing significant ($p \leq 0.05$) differences at the 14th day of storage.

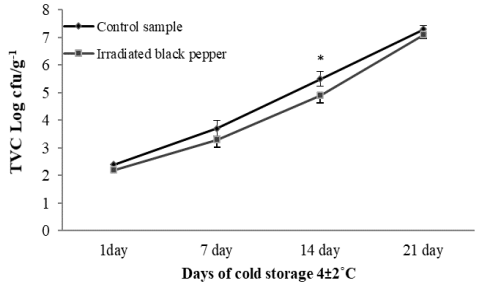

Figure 3. Total viable counts of mesophilic microorganisms

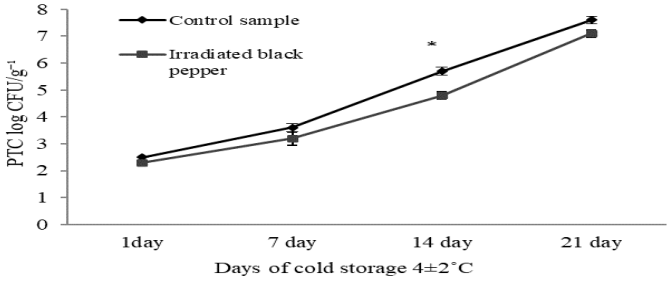

Figure 4. Total viable counts of psychrophilic microorganisms

TVB-N values were significantly lower at IBP samples, and this was in accordance with microbial status of mesophilic and psychrophilic counts which were significantly lower for IBP samples on the 14th day of storage. We assume that lower amounts of microorganisms are due to irradiation of black pepper and the smaller value from the initial stage so when exponential growth of microorganisms started the differences between values increased and become significant.

CONCLUSION

The overall quality of Bologna-type mortadella sausages showed decreasing trend and limited changes during short-term refrigerated storage. Flavor loss was evident at the beginning of storage while textural changes appeared mostly at the final stage of storage. Trained panelist spotted significant differences on the 14th day in favor of IBP samples for hardness and color intensity which led to significant score in overall appearance. In agreement with this, more examined parameters showed significant differences at the 14th day of storage in favor of IBP samples.

In summary, it might be concluded that γ-irradiation of black pepper (Piper Nigrum) gave the expected results and at the microbial analyses, sterility of black pepper grains was obtained. This led to significant changes in some sensory, bio-chemical and microbial examined parameters which can be considered as an improvement in quality characteristics and shelf life of Bologna-type mortadella sausages.

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Section B

TREATMENT OF CHRONIC PAIN IN PERSONS WITH CERVICAL SYNDROME: A LITERATURE REVIEW

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Abstract

Cervical syndrome, characterized by chronic neck pain and functional impairments affects quality of life. This review aimed to assess the determinants of quality of life and the effects of physical treatments in managing chronic neck pain. A systematic review was conducted using PubMed, MEDLINE and Elsevier databases, selecting studies published between 2010 and 2023 based on the PICOS criteria. The methodological quality of the included studies was evaluated with Cochrane risk of bias tool and the Newcastle-Ottawa scale. Twenty-nine studies analyzing interventions such as stabilization exercises, McKenzie techniques, Pilates and Feldenkrais methods were reviewed in this study. The results indicated that physical treatments reduced pain intensity and improved quality of life, with combined physical and psychological therapies seeking superior outcomes. However, considerable heterogeneity was observed in pain reduction (I^2 = 65%) and quality-of-life improvement (I^2 = 72%), and methodological limitations were noted, especially regarding blinding and comparability. This review focus on the effects of physical treatments for chronic neck pain while accenting the need for standardized protocols and integrated therapeutic approaches to improve patient outcomes.

Keywords: Cervical Syndrome, Chronic Neck Pain, Quality of Life, Physical Therapy, Motor Learning, McKenzie techniques, Rehabilitation

INTRODUCTION

Cervical syndrome is a set of disorders caused by changes in the cervical spine and the soft tissues that surround it, with pain as the dominant symptom. Cervical syndrome is one of the most common problems today (Kasumovic et al. 2013). Chronic, progressive damage to the cervical spine is experienced by patients through significant pain, functional neurological decline, and ultimately disability (Hirayama et al. 2021). Altered neuromotor control occurs as a consequence of decreased deep neck flexor activity and increased superficial muscle activity and contraction rather than coordination (Aydogmus et al. 2022).

Neck pain is common. Poor posture can cause muscle imbalance, resulting in a disproportion between different parts of the body. Holding the head forward is one of the most common manifestations of cervical dyscoordination. Cervical syndrome is a common uncomfortable and postural pain characterized by a protruding chin and rounded shoulders (Kasumovic et al. 2013). The normal anatomy of the cervical spine changes with advancing age, which can cause neck pain and long-term disability. Neck pain is prevalent in adults, although it can occur at any age. According to the 2017 Global Burden of Disease Study, the point prevalence of neck pain peaked in middle age and declined thereafter, with the highest burdens in the 45–49 and 50–54 age groups for men and women, respectively (Safiri et al. 2020).

Quality of life, when compared with other chronic diseases, appears to be particularly poor, although the determinants of quality of life in patients with chronic neck pain are poorly understood (Hirayama et al. 2021). Hence, we can state that psychological risk factors such as long-term stress, lack of social support, anxiety, and depression are important risk factors for chronic neck pain. In terms of biological causes, neck pain, as mentioned, can occur as a result of certain diseases, such as neuromuscular-skeletal disorders. A patient's risk of neck pain increases with lifestyle factors, including advanced technology, previous neck injuries, cervical strains, and osteoarthritis (Metzger 2019). As mentioned earlier, the psychological state of patients is an important risk factor in the manifestation of pain in the cervical spine. The relationship between depression and neck pain appears to be bidirectional (Juan, Rui and Wei 2020).

Mood disorders, especially depression, have been found to be associated with chronic neck pain and disability (Ahmed et al. 2019). In any case, regardless of the causes of chronic pain in the cervical spine, it should be treated. Below is an overview of studies that discuss the effect of exercises on the treatment of chronic neck pain, as well as other risk factors associated with cervical syndrome.

The aims of this literature review are to perform a systematic review of the determinants of quality of life in individuals with cervical syndrome and the role of physical treatment in reducing pain and improving the quality of life of these persons.

METHODOLOGY

This systematic review is exploring the determinants of quality of life in persons with cervical syndrome and assess the impact of physical treatments on reducing pain and improving quality of life. The methodological approach was designed to make sure for a comprehensive and unbiased synthesis of the existing literature.

Search strategy

A systematic search was ued across several databases (PubMed, MDPI, MEDLINE, Elsevier, Global Spine Journal, and BioMed). The search strategy is a combination of keywords and Medical Subject Headings (MeSH) terms like "cervical syndrome," "chronic neck pain," "physical treatment," "quality of life," "psychological factors," and "rehabilitation." Boolean operators were used to refine the search and include all relevant studies.The initial search was complemented by manual searches of the reference lists of included articles to ensure no relevant studies were missed. Duplicate records were removed using a reference management tool, and all retrieved articles were screened for eligibility based on predefined criteria.

PICOS Framework

Table 1 PICOS criteria

Criterion	Details
Population (P)	Adults - 18 years and older diagnosed with cervical syndrome or chronic neck pain.
Intervention (I)	Physical treatments like neck stabilization exercises, Pilates, McKenzie techniques, Global Postural Rehabilitation (GPR), Feldenkrais Method, Mulligan mobilization and Yoga-Pilates.
Comparator (C)	Standard care, alternative rehabilitation methods, psychological interventions or no treatment.
Outcomes (O)	Primary: Pain reduction, improved quality of life. Secondary: Increased functional mobility, psychological well-being and reduced absenteeism.
Study Design (S)	Randomized controlled trials (RCTs), cohort studies, case-control studies, longitudinal studies, and systematic reviews.

Table 1shows a structured framework for the selection and assessment of studies included in this review. For population, the focus is on adults diagnosed with cervical syndrome or chronic neck pain, as these groups are most affected by the condition and its treatment modalities.A range of physical treatments was analyzed in intervention, focusing on their effectiveness in managing chronic neck pain and improving patients' quality of life.The interventions were compared against standard care or alternative methods to evaluate their relative efficacy.Both clinical (pain relief and functional mobility) and patient-centered (quality of life and psychological well-being) outcomes were prioritized.High-quality studies like RCTs and systematic reviews were prioritized to make sure of methodological rigor.

Inclusion and Exclusion criteria

- The inclusion criteria for this study were:
- Peer-reviewed studies published between 2010 and 2023.
- Articles reporting on adults diagnosed with cervical syndrome or chronic neck pain.
- Studies researching physical treatments and their outcomes on pain and quality of life.

- Studies available in English and providing full-text access.
- The exclusion criteria were:
- Studies focusing on pediatric populations or conditions unrelated to cervical syndrome.
- Non-peer-reviewed articles, editorials, or opinion pieces.
- Articles lacking clear methodologies or outcomes relevant to the study aims.

Study selection and screening

1. The study selection process was implemented in three stages:
2. Title and Abstract Screening: Two independent reviewers screened the titles and abstracts of all identified studies for relevance.
3. Full-Text Review: Studies deemed potentially relevant were reviewed in full to confirm their eligibility based on the PICOS criteria.
4. Data Extraction: Key data were extracted from each included study, including study design, population characteristics, interventions, comparators, outcomes, and findings.

Quality assessment

- The quality of the included studies was assessed using validated tools:
- RCTs: The Cochrane risk of bias tool was applied to evaluate potential biases in randomization, blinding, and outcome reporting.
- Observational Studies: The Newcastle-Ottawa Scale (NOS) was used to assess study quality based on selection, comparability and outcomes.
- Studies were categorized as high, moderate, or low quality based on their scores, and only moderate- and high-quality studies were included in the final synthesis.

Data synthesis

The findings from included studies were synthesized narratively, with a focus on identifying patterns and differences in outcomes across various physical treatments. Where feasible, meta-analyses were performed to quantify the pooled effects of specific interventions on pain reduction and quality of life. Heterogeneity was assessed using the I^2 statistic, and a random-effects model was applied when significant heterogeneity was present.

Ethical considerations

As this study involves secondary analysis of published data, no ethical approval was required. Almost all included studies were required to have obtained ethical approval from their respective review boards.

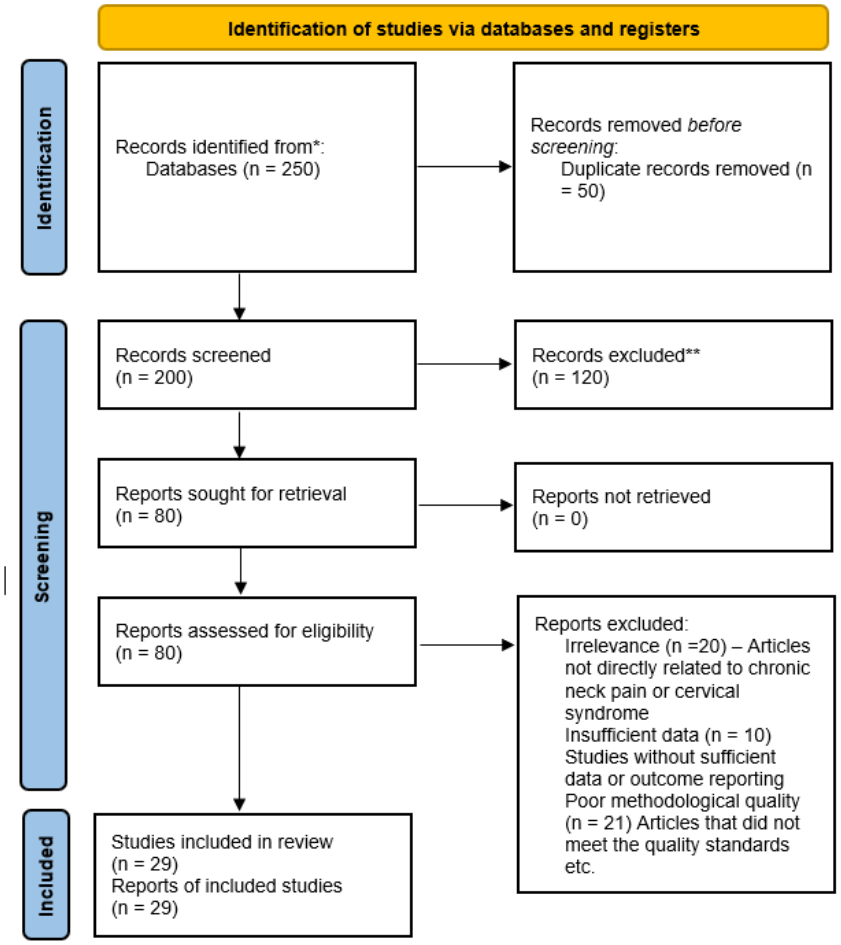
Identification of studies via databases and registers
Identification
Records identified from*:
Databases (n = 250)
Records removed *before screening*:
Duplicate records removed (n = 50)
Screening
Records screened
(n = 200)
Records excluded**
(n = 120)
Reports sought for retrieval
(n = 80)
Reports not retrieved
(n = 0)
Reports assessed for eligibility
(n = 80)
Reports excluded:
Irrelevance (n =20) – Articles not directly related to chronic neck pain or cervical syndrome
Insufficient data (n = 10)
Studies without sufficient data or outcome reporting
Poor methodological quality (n = 21) Articles that did not meet the quality standards etc.
Included
Studies included in review
(n = 29)
Reports of included studies
(n = 29)

Figure 1 PRISMA Guidelines

Figure 1 shows thePRISMA flow diagram that illustrates the systematic process taken for the identification, screening, eligibility assessment and inclusion of studies in the review. It provides a transparent overview of the study selection process.A total of 250 records were identified through systematic searches in databases such as PubMed, MEDLINE, and Elsevier.Before screening, 50 duplicate records were removed, resulting in 200 records eligible for further screening.During the initial screening process, 200 records were assessed based on their titles and abstracts to determine their relevance.A total of 120 records were excluded at this stage for failing to meet the inclusion criteria or being irrelevant to the study topic.A total of 80 full-text articles were sought for retrieval and assessed for eligibility.All 80 articles were successfully retrieved and underwent a thorough review based on the predefined inclusion and exclusion criteria.Of the 80 full-text articles, 51 were excluded for the following reasons:

- Irrelevance (n = 20): Articles not directly related to chronic neck pain or cervical syndrome.
- Insufficient data (n = 10): Studies lacking sufficient data or outcome reporting.
- Poor methodological quality (n = 21): Articles that failed to meet quality standards or lacked robust methodologies.

A total of 29 studies were eligible and included in the qualitative synthesis. These studies form the basis of the review and provide valuable insights into the determinants of quality of life and the efficacy of physical treatments in individuals with cervical syndrome.

RESULTS

A total of 29 studies were included in the qualitative synthesis, assessing the effectiveness of physical treatments for chronic neck pain among individuals with cervical syndrome. The studies used various interventions like stabilization exercises, Pilates, McKenzie techniques and psychological therapies with outcomes ranging from pain reduction to quality-of-life improvement.

Interventions such as McKenzie techniques, Pilates, and Feldenkrais methods demonstrated reductions in pain intensity and improvements in quality of life. Studies combining physical treatments with education and psychological interventions reported better outcomes compared to standalone physical interventions. Most studies included participants aged 18–65 years, with varying degrees of chronic neck pain and cervical syndrome.

Bias assessment of the included studies

The bias assessment of the 29 included studies was conducted using the Cochrane Risk of Bias Tool for randomized controlled trials (RCTs) and the Newcastle-Ottawa Scale for observational studies. The Cochrane Risk of Bias Tool evaluates seven key domains:

Random Sequence Generation (Selection Bias): at low risk, 20 studies used robust randomization methods such as computer-generated random numbers or sealed envelopes.5 studies used methods like alternate allocation or did not adequately randomize participants.4 studies failed to describe their randomization process.

Allocation Concealment (Selection Bias):18 studies implemented methods like opaque sealed envelopes to ensure allocation concealment.6 studies lacked allocation concealment, which may have introduced bias.5 studies did not report their allocation procedures clearly.

Blinding of Participants and Personnel (Performance Bias):15 studies ensured proper blinding of participants and personnel to reduce performance bias.8 studies lacked blinding, which could have influenced the results.6 studies provided insufficient details on their blinding protocols.

Blinding of Outcome Assessment (Detection Bias):16 studies blinded outcome assessors, ensuring objective evaluation of outcomes.7 studies did not blind assessors, increasing the likelihood of detection bias.6 studies provided insufficient information about blinding procedures.

Incomplete Outcome Data (Attrition Bias):22 studies had complete outcome data with low attrition rates (<5%) or appropriately addressed missing data.4 studies had high dropout rates without proper explanations, which could bias the results.3 studies did not clearly report how they handled incomplete data.

Selective Reporting (Reporting Bias):24 studies reported all pre-specified outcomes, demonstrating transparency.3 studies selectively reported outcomes, potentially favoring significant results.2 studies lacked sufficient information on outcome reporting.

Additional risks, such as funding sources and conflicts of interest, were considered. 21 studies adequately disclosed funding sources and had no evident conflicts of interest, while 8 studies lacked transparency in this regard.

Table 2: Cochrane risk of bias

Domain	Low Risk	High Risk	Unclear Risk
Random Sequence Generation	20	5	4
Allocation Concealment	18	6	5
Blinding of Participants	15	8	6
Blinding of Outcome Assessment	16	7	6
Incomplete Outcome Data	22	4	3
Selective Reporting	24	3	2

Based on Table 2, most studies showed low risk in randomization and reporting domains, though several studies had unclear or high risk for allocation concealment and blinding due to methodology limitations.

The Newcastle-Ottawa Scale was used to evaluate the quality of observational studies. The scale assesses three domains: selection, comparability, and outcome. Each study received a score out of 9, with higher scores indicating higher methodological quality. For selection, 22 studies scored 3 or 4 points for using representative samples, clearly defining case inclusion criteria, and recruiting appropriate controls.7 studies scored lower due to unclear case definitions or unrepresentative samples.

For comparability18 studies controlled for at least one major confounder (e.g., age, severity of cervical syndrome) in their analyses.11 studies did not adequately account for confounders, reducing their comparability.

For outcome, 25 studies scored 2 or 3 points for clear outcome measurement, appropriate follow-up durations, and adequate handling of attrition.4 studies scored lower due to unclear outcome reporting or short follow-up periods. Distribution of NOS Scores were:

- High Quality (7–9 points): 19 studies;
- Moderate Quality (4–6 points): 8 studies;
- Low Quality (<4 points): 2 studies;
- Key Insights from the Bias Assessment.

Most studies demonstrated low risk of bias in random sequence generation, outcome reporting, and handling incomplete data, ensuring reliability in these domains.Observational studies generally performed well in selection and outcome domains, reflecting careful methodological design.Blinding was a significant issue, with many studies failing to blind participants, personnel, or outcome assessors, which could introduce performance and detection biases.Comparability across observational studies was limited, with many failing to adjust for key confounders like age, psychological status, and lifestyle factors.

Table 3: The Newcastle-Ottawa scale

Domain	Criteria	Number of Studies
Selection	Adequate case definition, representativeness	22
Comparability	Adjustment for confounders	18
Outcomes	Clear outcome measurement and follow-up	25

Based on Table 3, most studies scored well in outcome measurement and selection domains, though comparability was weaker due to incomplete adjustment for confounders.

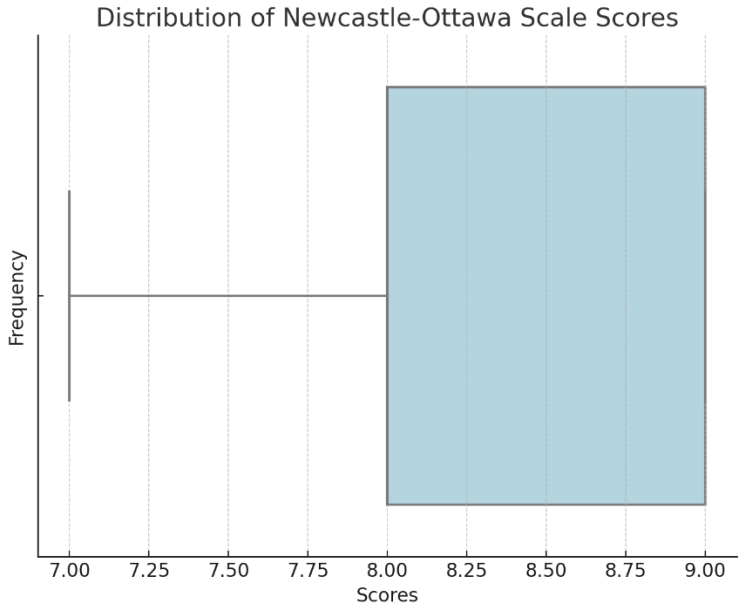

Figure 2: Distribution of Newcastle-Ottawa scale scores across included studies.

Figure 2 shows the distribution of Newcastle-Ottawa scale scores across the included observational studies. The scores range from 7 to 9, indicating a generally high methodological quality of the studies. The interquartile range spans from 8 to 9, showing that the majority of studies scored within this range. The whiskers extend to a minimum score of 7, showing the lowest quality studies included in the analysis. The lack of outliers indicates consistent scoring across the studies, reflecting robust selection, comparability and outcome measurement methods in the evaluated research.

The heterogeneity of the included studies was analyzed to evaluate the variability in the results due to differences in study populations, intervention protocols, outcome measures and methodologies. Heterogeneity was quantified using the I^2 statistic, which measures the percentage of variation across studies that is due to heterogeneity rather than chance. The level of heterogeneity was classified as low ($I^2 < 25\%$), moderate ($I^2 = 25–50\%$), substantial ($I^2 = 50–75\%$) or considerable ($I^2 > 75\%$).

For the key sources of heterogeneity, we used study populations - Variations in age, gender, and baseline severity of cervical syndrome among study participants contributed significantly to heterogeneity. Also, some studies focused exclusively on specific subgroups, such as individuals with psychological comorbidities or those with sedentary lifestyles, while others included broader populations. For intervention protocols, the included studies used diverse intervention methods, such as Pilates, McKenzie techniques, Feldenkrais methods, and general physical therapy. Differences in the intensity, frequency, and duration of interventions added variability to the observed outcomes. For the outcome measures, pain reduction was measured using various scales, such as the Visual Analog Scale (VAS) and Numeric Pain Rating Scale (NPRS), while quality of

life and functional mobility were assessed using different validated questionnaires. The diversity in outcome assessment tools created variability in the reported effect sizes.

Table 4: Heterogeneity table of included studies

Outcome	**I^2 (%)**	**Heterogeneity Level**	**Possible Sources of Heterogeneity**
Pain Reduction	65	Substantial	Diverse interventions and variations in baseline severity.
Quality of Life Improvement	72	Substantial	Use of different quality of life assessment tools.
Functional Mobility	58	Moderate	Variability in functional assessment methods.
Psychological Well-Being	78	Considerable	Differences in psychological measures and baseline status.

Based on Table 4, substantial heterogeneity ($I^2 = 65\%$) was observed, reflecting variability in intervention types, patient demographics, and baseline severity. This suggests that while all interventions showed effectiveness, their relative impacts varied.With an I^2 value of 72%, the studies exhibited substantial heterogeneity, largely due to differences in the tools used to assess quality of life, such as the SF-36 and EQ-5D scales for the quality-of-life improvement. Moderate heterogeneity ($I^2 = 58\%$) was observed in functional mobility, primarily attributable to differences in the functional mobility tasks and assessment tools.The most considerable heterogeneity ($I^2 = 78\%$) was noted in studies assessing psychological outcomes. This reflects differences in baseline psychological status and the inclusion of diverse psychological interventions, such as mindfulness or cognitive behavioral therapy, in some studies.

DISCUSSION

Chronic neck pain is a highly prevalent disorder in primary health care, occurring with a prevalence of 5.9% to 38.7% in the general population (Kazeminasab et al. 2022), 19.5% in Spain (Fernandez et al. 2011), and 13.8% in the USA (Deyo et al. 2002). This pathology represents 0.6% of the world's population suffering from disabling neck pain (Cote et al. 2008), affecting 18% of the population (Lee et al. 2015) and causing 10% absenteeism (Coenen et al. 2020) and long-term disability, which is particularly important for the socio-economic aspect in industrialized countries (Cohen 2015). Studies analyzing the need for musculoskeletal rehabilitation, considering prevalence and years of life with disability, indicate that neck pain has ranked fifth among conditions with the highest demand for musculoskeletal rehabilitation in the last three decades (Chen, Fong and Wong 2021). It is believed that most cases of acute neck pain will resolve with or without treatment, while 50% of such cases continue to suffer from neck pain, affecting their quality of life and functionality (Cohen 2015).

A sedentary lifestyle, characterized by static head and shoulder positions, causes muscle stress and imbalance and has been identified as a contributor to chronic neck pain (Coenen et al. 2020) There is evidence that demographic characteristics, such as age and gender, may influence the prevalence and development of neck pain; however, further research is needed. Aging is the most significant biological risk factor for most chronic pain; therefore, identifying protective and

risk factors is critical for raising awareness of effective preventive measures and educational interventions for high-risk groups (McLean et al. 2010). Educating patients would enable them to participate actively in their recovery, thereby improving their posture through active coping strategies (MacPherson et al. 2017), such as minimizing and treating cervical syndrome (Blanpied et al. 2017). Informing these individuals about their own problems would enhance their quality of life.

Cervical pain often correlates with neck range of motion (CROM) and psychological factors that can intensify pain and disability (Alacreu et al. 2018). A biopsychosocial approach is effective not only in improving quality of life (QoL) but also in reducing neck pain (CNP) (Edmond et al. 2020). Patients with musculoskeletal disorders are the most common group that can benefit from rehabilitation services (Cieza et al. 2019). In particular, the guidelines of the American Physical Therapy Association (APTA) and the American Medical Association recommend Yoga-Pilates as therapeutic exercises within alternative medicine. Methods such as McKenzie, the Alexander Method, Feldenkrais, and Global Postural Rehabilitation are recommended for correcting posture in individuals with neck pain.

Through strengthening, flexibility, and ergonomic advice, posture correction can be achieved. Postural rehabilitation methods are utilized in the treatment of cervical syndrome, especially among desk workers, such as Global Postural Rehabilitation (GPR) (Pillastrini et al. 2016), while others focus on a biomechanical approach, such as the McKenzie method (MK). McKenzie and segmental spinal stabilization exercises have proven effective for pain management in individuals with cervical postural syndrome. However, it was found that out of the two techniques, the McKenzie protocol was more beneficial than segmental spinal stabilization exercises (Avaghade, Shinde and Dhane 2023).

According to (Sheikh et al. 2023), a significant reduction in neck pain and back pain was observed with Feldenkrais (FM) combined with a conventional exercise protocol for corporate employees working from home during COVID-19. The data indicated a significant decrease in neck and lower back pain. Anxiety and range of motion for the basal outcomes of lateral flexion indicate a good prognosis for the mobilization technique known as Mulligan (Carnero et al. 2022). Isometric neck exercises and craniocervical flexion exercises led to improvements in pain, the neck disability index (NDI), and active range of motion in all three planes after eight weeks (Chung and Jeong 2018).

Pilates emphasizes isometric muscle activation for core stability. The objectives of Pilates are to strengthen and train the core muscles across all three planes of trunk control (Cazotti et al. 2018). Neck and upper quadrant strengthening exercises resulted in a moderate effect on neck pain in the short term (Sterling et al. 2019). The evidence was of moderate quality at best. Other treatments, including education and psychological therapy, have shown only small effects, based on low- to moderate-quality evidence. Pain sensitivity may worsen after treatment, despite reduced intensity and unchanged neck disability scores over six months in individuals with cervical syndrome (Ortego et al. 2022).

CONCLUSION

This review focus on the complexity and multifactorial nature of chronic neck pain in individuals with cervical syndrome, underscoring the importance of both physical and psychological interventions in improving patient outcomes. Chronic neck pain, characterized by

its high prevalence and debilitating effects, remains a significant public health concern that adversely impacts quality of life, functional mobility, and psychological well-being.

The findings from the 29 included studies suggest that a range of physical interventions, such as McKenzie techniques, Pilates, Feldenkrais methods, and Global Postural Rehabilitation can significantly alleviate pain and improve quality of life. However, the variability in intervention protocols, outcome measures, and study populations introduces challenges in synthesizing the evidence. Substantial heterogeneity was observed across studies, particularly in measures of quality of life and psychological outcomes, indicating the need for standardized methodologies in future research.

Key insights from the bias assessment reveal that while most studies demonstrated low risk in domains such as randomization and outcome reporting, significant limitations were noted in areas such as blinding and comparability. The Newcastle-Ottawa Scale scores indicated high methodological quality for the majority of the observational studies, though adjustments for confounders were often incomplete, limiting the generalizability of findings.

This review also underscores the critical role of psychological factors in chronic neck pain. Depression, anxiety, and other mood disorders were identified as both risk factors and consequences of cervical syndrome, emphasizing the need for a biopsychosocial approach in managing this condition. Studies that integrated psychological therapies with physical interventions reported superior outcomes, suggesting that a multidisciplinary strategy may be the most effective approach to treatment.

Despite the promising results of physical interventions, the overall effectiveness of general rehabilitation programs for cervical syndrome remains suboptimal. This highlights a critical gap in clinical practice and research, with a need for more targeted interventions tailored to individual patient profiles. The evidence also points to the importance of patient education in promoting active participation in recovery, thereby enhancing treatment efficacy and long-term outcomes.

In conclusion, while this review provides valuable insights into the determinants of quality of life and the efficacy of physical treatments for chronic neck pain, it also reveals significant gaps in the current evidence base. Future research should prioritize methodological rigor, standardized outcome measures, and the integration of physical and psychological therapies to address the diverse needs of patients with cervical syndrome. By adopting a comprehensive, evidence-based approach, healthcare providers can optimize treatment strategies and improve the quality of life for individuals affected by this debilitating condition.

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Section B

THE IMPACT OF THE ZEOLITE ON THE GROWTH OF THE COMMERCIALLY GROWN RAINBOW TROUT

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Abstract

This study evaluates the impact of zeolite supplementation in feed on the growth and condition of commercially grown rainbow trout. Over 12 weeks, 600 rainbow trout were divided into three groups (200 fish per group) and reared under standardized conditions. Group A received only commercial feed, while Groups B and C were supplemented with 1% and 2% zeolite, respectively. Growth performance and Fulton's condition factor were assessed biweekly on eight occasions.
The greatest growth was observed in Group B, followed by Group C, with the lowest growth in Group A. Fulton's condition factor decreased as fish mass and length increased, ranging from 1.34 to 0.91 in Group A, 1.34 to 0.84 in Group B, and 1.12 to 0.96 in Group C. Notably, Group C demonstrated the best final condition factor (0.96) and feed conversion efficiency.
Zeolite supplementation, particularly at 1%, significantly enhances growth performance in rainbow trout, while 2% supplementation improves condition factor and feed efficiency. These findings highlight zeolite's potential as a beneficial feed additive in aquaculture systems. Further research is recommended to optimize dosage and evaluate long-term effects.

Keywords: fisheries, rainbow trout, zeolite, conditioning factor, growth factor.

INTRODUCTION

Zeolite is natural, safe and absolutely non-toxic minerals used in industry and agriculture with multiple purposes. It does not cause any negative effects or contraindications, which is confirmed by the results obtained from the chemical and toxicological analyzes carried out by numerous professional and eminent experts.

The morphological and structural characteristics of zeolite confirm that it is an aluminosilicate mineral of volcanic origin. Its crystal lattice is negatively charged and functions as an ion exchanger.

The literature indicates that the main and fundamental role of zeolites in everyday life is their application in aquaculture. It has been proven that they realize this role through:
- ensuring pollution control in swimming pools
- removal of N-compounds from the water of hatcheries, fish transport and aquariums.

Zeolites increase the concentration of oxygen in the aquarium. Thanks to the nutritional supplement, the values of the fish growth parameters increase (Alp, 2005;Tepe et al., 2005; Aybal, 2001; Mumpton, 1999; Pond, 1984; Watten, 1985; Dryden, 1989; Peyghan et al., 2002; Ravendra et al., 2004; Kaiser et al., 2006; Torre, 2006; Kanyilmaz, 2010).

The main objective of this research is to determine the influence of the mineral zeolite added to feed on the production parameters of commercially reared rainbow trout.

Tasks of the research are:
- To determine the growth of trout;
- To determine the condition factor

MATERIAL AND METHODS

The research was conducted with an experiment that was carried out in the registered production for raising rainbow trout of Ribo export Ltd. In Gorna Banjica, Gostivar. Three pools were involved in the performance of the procedure, which were named numerically, i.e. pool no. 22(group A), no. 23(group B) and no. 24(group C).

The experiment was conducted in standardized conditions, each of the pools had dimensions: length 4m, width 1m and depth 45 cm, with a total water capacity of 1.8 m3, temperature of 11°C at an oxygen concentration of 9-11 mg/l.

In each of the three pools, 200 juvenile rainbow trout with an initial weight of 46-48 g and a length of 15-16 cm were monitored for 12 weeks.

The mass, length and width of the fish were measured for each individual in the three pools. The measurements were carried out on 6 occasions, every 14 days.

Photo 1 – Implementing fishes in pool

For all species of rainbow trout we used commercial food from the company Skretting, Italy. Which according to the instructions for use in feeding is used 1 to 2% of the biomass per day. The feed had a granulation of 4 mm and contains protein 44%, Ca 1.1%, crude fat 22%, wheat, blood products, fish oil, animal fats from poultry, mono-ammonium phosphate, wheat gluten, hydrolyzed feather meal, poultry protein, fish meal, permeate whey powder, beet oil and wheat flour.

The zeolite is a product of the company Zeo-Medic D.o.o from Belgrade, Republic of Serbia, produced in 2022.

Feed preparation

22.3 g of zeolite in powder form was added to heated water. By mixing it, a suspension was obtained in a liquid aggregate state. This suspension was then added to 2,419 kg of commercial food. The whole mixture was mixed by hand for 2-3 minutes.

The experimental procedure began with the breeding of rainbow trout samples in group A (control group), groupB (experimental group 1) and groupC (experimental group 2). In group Acommercial food without addition of Zeolite was used, in groupB, 1% zeolite was added to the commercial fish feed.In groupC, zeolite was added in a concentration of 2%.

The following parameters were monitored in all groups:

- growth of fish,
- condition factor,

Fish growth was determined by the difference in mass in two consecutive measurement times.

The condition factor was determined according to Fulton's formula (F=W(g)/L(cm)x100).

The following statistical methods were applied for the realization of the research:

- descriptive statistics of mean values for mass, length and width of fish and dispersion values (variance, standard deviation and coefficient of variation)
- universal analysis of variance (ANOVA).

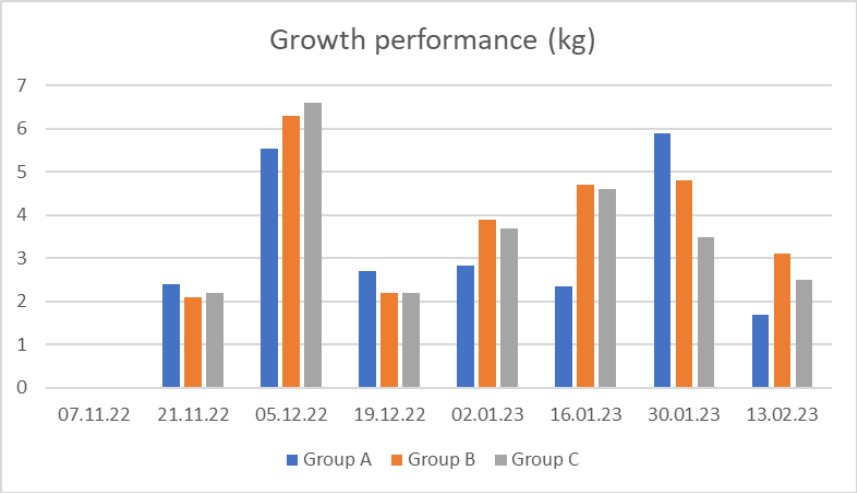
RESULTS AND DISCUSSION

GROWTH PERFORMANCE

The growth of fish during the period of measurements in group A in the first two weeks (from the first to the second measurement) is 2.4 kg, in the following two weeks (from the second to the third measurement) it is 5.53 kg, in the subsequent intervals it is 2.7 kg, 2.84 kg and 2.36kg, while in the next it is the largest of 5.9 kg. The last interval has the smallest increase in the measurement period of only 1.7 kg.

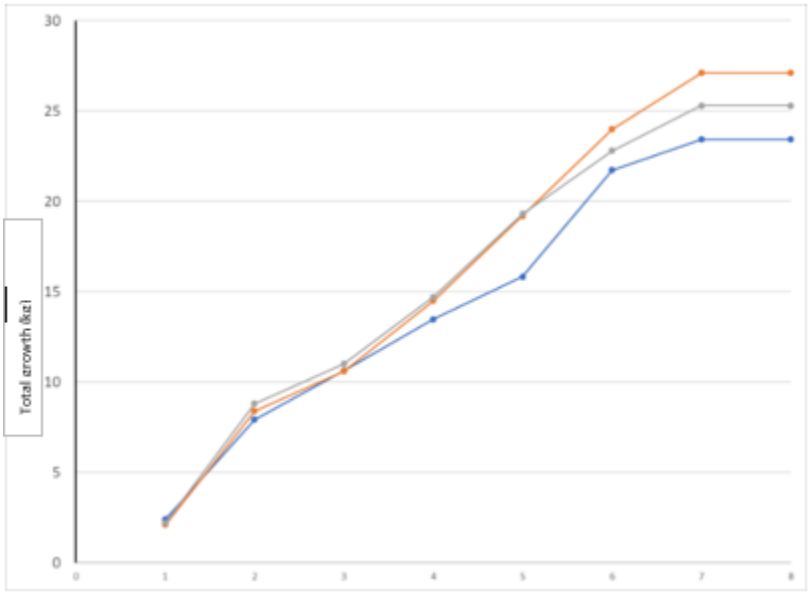
The growth of fish during the period of measurements in group B in the first two weeks (from the first to the second measurement) is 2.1 kg, in the following two weeks (from the second to the third measurement) it is 6.3 kg (the largest increase), in the subsequent intervals it is 2.2 kg, 3.9 kg and 4.7 kg, while in the next it is 4.7 kg. The last interval in the measurement period is with an increase of 3.1 kg.

The growth of fish during the period of measurements in group C in the first two weeks (from the first to the second measurement) is 2.1 kg (the smallest increase), the following two weeks (from the second to the third measurement) is 6.6 kg (the largest increase), in the subsequent intervals it is 2.2kg, 3.7 kg and 4.6 kg, while in the next it is 3.5 kg. The last interval is with an increase of 2.5 kg (Graph 1).



Graph 1: Growth performance gr. A, B and C

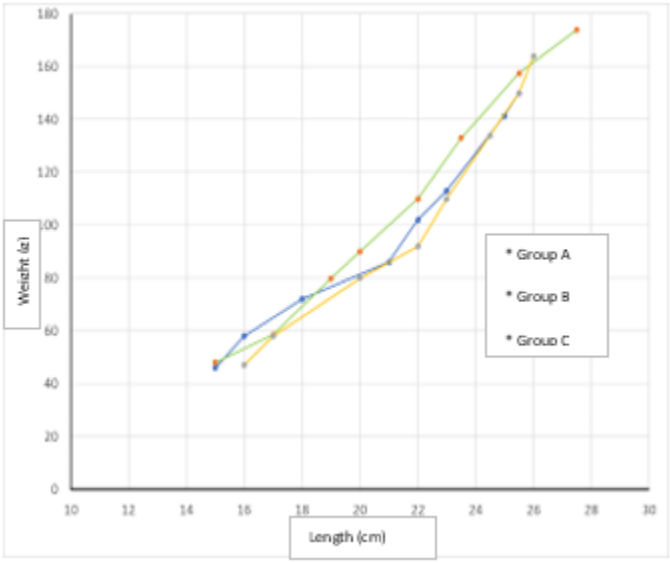
The total increase in group A is B.43 kg, in group B is 27.1 kg, while in group C is 25.3 kg. It can be noted that the fish that have the greatest increase have an addition of 1% zeolite, that is, in group B, while the fish that are fed only with commercial food have the lowest increase (graph 2).



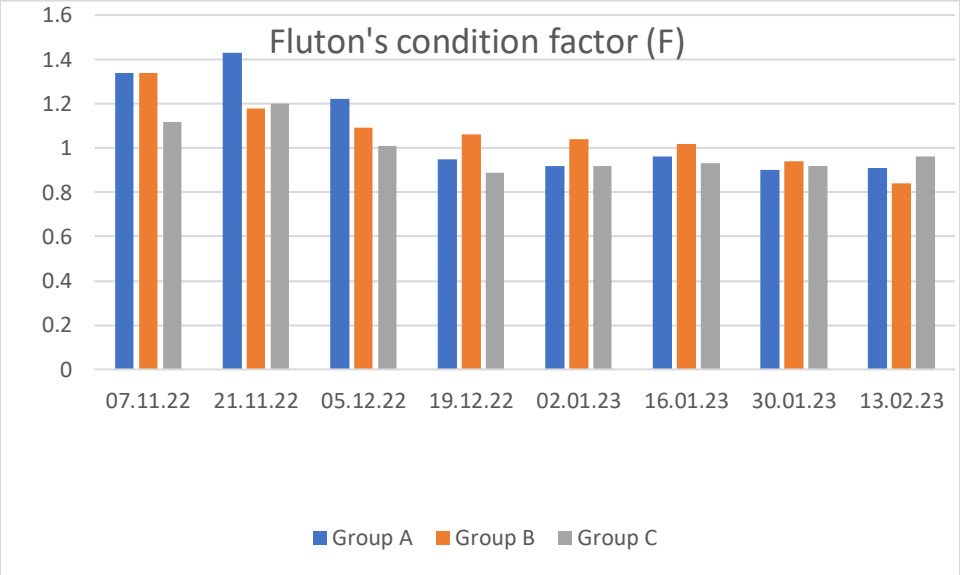
Graph 2: Total growth of fish gr. A, B and C

CONDITIONING FACTOR

The dependence between the mass and the length of the fish shows that with an increase in the mass of the fish, their length also increases, Graph 3.

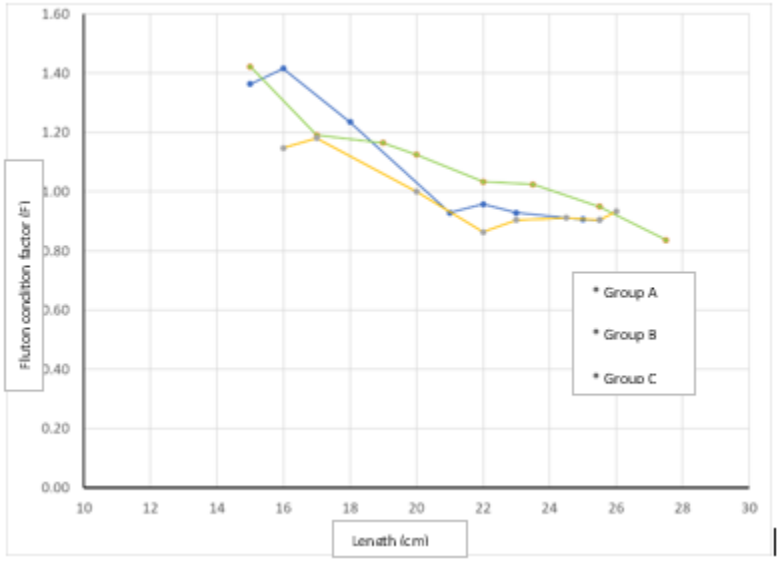


Graph 3: Dependence of mass and length of the fish

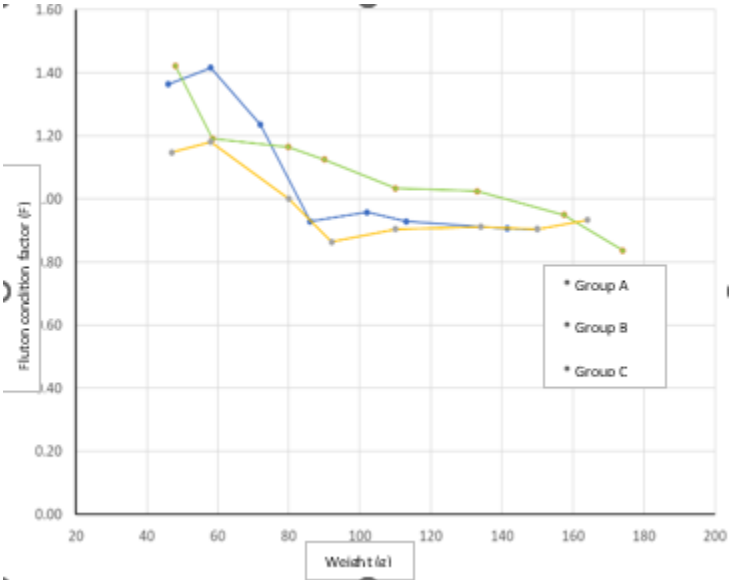


Graph 4: Comparative graph of the Fulton at all groups

The relationship between fish mass, length and Fulton's coefficient shows that as fish mass and length increases, Fulton's coefficient decreases.



Graph 5: Dependence of fish length and Fluton's coefficient



Graph 6: Dependence of fish weight and Fluton's coefficient

The growth of fish during the period of measurements in group A in the first two weeks it was 2.4 kg, the next two weeks it was 5.53 kg, the next intervals were 2.7 kg, 2.84 kg and 2.36 kg, while in the next it is the largest of 5.9 kg. The last interval has the smallest increase in the measurement period of only 1.7 kg.

The growth of fish during the period of measurements in group B in the first two weeks is 2.1 kg, in the following two weeks it is 6.3 kg in the subsequent intervals it is 2.2 kg, 3.9 kg and 4.7 kg, while in the next it is 4.7 kg. The last interval in the measurement period is with an increase of 3.1 kg.

According to the monitored dynamics, the growth of rainbow trout in group B and C showed the highest values from the second to the third measurement. In group A, the largest increase was registered in the seventh measuring interval, which was 5.6 kg. The greatest increase was measured in group C, i.e. 6.6 kg, then in group B with close values of 6.3 kg.

In the paper of Güler et al., 2018, it is indicated that zeolite positively affects many physiological parameters of fish growth. To arrive at these findings, rainbow trout (Oncorhynchus mykiss) were fed food containing zeolite at different rates (1%, 3% and 5%) for a period of three months. Also the hematological findings were analyzed by monitoring the total number of erythrocytes (RBC), total number of leukocytes (WBC),hemoglobin (Hb), hematocrit (Hct), total platelet count (PLT), erythrocyte sedimentation rate (SR), mean cell hemoglobin concentration (MCHC), mean cell hemoglobin (MCH), and mean cell volume (MCV).

At the end of the study, changes in growth parameters were determined, but the only parameter where a statistically significant difference ($p<0.05$) was detected after the applied zeolite was the fitness factor. Using of zeolite caused a change in blood indices, of which WBC, SR and MCV values were statistically significant ($p<0.05$).

Dias et al., 1998 studied the influence of dietary regimen using cellulose and natural zeolite. In their article, they monitored protein digestibility, growth, feed intake and feed conversion time in aquaculture. Effects of zeolite in preventing acute ammonia toxicity was studied in common carp by Peyghan and Takamy, (2002) and in rainbow trout by Erguen et al. (2008). Danbas (2011) studied the fatty acid levels of rainbow trout fed zeolite. Danbas and Altun (2011) investigated the effects of zeolite on some growth parameters of rainbow trout.

The obtained results indicate the fact that after the application of zeolite, advanced growth and development of the rainbow trout and correction of the biochemical and hematological parameters of the rainbow trout were registered.

The condition factor during the period of measurements in group A ranges from 1.34 (at first measurement) to 0.91 (last measurement). It is noticeable that the factor decreases with increasing mass and length of fish. In group B ranges from 1.34 (at the first measurement) to 0.84 (the last measurement). It is noticeable that the factor decreases with an increase in the mass and length of the fish, while in group C ranges from 1.12 (at first measurement) to 0.96 (last measurement). It is noticeable that the factor decreases with increasing mass and length of fish.

This result can be explained in the following way. This study from the beginning had several limitations and that is, the food was prepared for a period of 14 days and not every day, the food was applied manually and not through automatic feeders. I believe if these limitations are changed that the fitness factor would also be different.

From the research carried out regarding the food conversion coefficient, it is evident that in group A it is 0.89 (with a total of 20.9 kg of food consumed, the increase is 23.43 kg, in group B it is 0.845 (with a total of 22.9 kg of food consumed, the increase is 27.10 kg), and in group C it is 0.896 (with a total of 22.68 kg of food consumed, the increase is 25.30 kg).

Regarding the influence of zeolite on parameters important for the growth and development of rainbow trout, we found certain data in the literature. Shalaby et al. (2009) reported that the addition of zeolite at different concentrations of 1% and 2% to tilapia Zilli during 45 days resulted in an increase in body weight, an increase in specific growth rate and better efficiency in aquaculture individuals. Mostafa et al. (2010) registered that by adding 20, 40, 80 and 120 mg/l. zeolite in carp had a positive effect on growth parameters and water quality criteria. Also, Shalaby et al. (2009) reported that zeolite used as feed additive improved growth parameters, feed evaluation coefficient and water quality criteria of tilapia fish. Stetca and Morea (2013) conducted research to determine the physiological effects of natural zeolites in fish feeding and found that 3% and 7% of zeolite as a feed supplement did not change the physiological status. and 43% Ghiasai and Jasour (2012) in their study confirmed that feed conversion rate and specific growth rate increased significantly as a result of zeolite application in fish.

Danbas and Altun (2011) monitored the effect of adding zeolite to rainbow trout reared water. After applying different zeolite concentrations of 1, 2, and 3 mg/l, they observed numerous positive statistical parameters in the growth of the sample.

In the studies that follow, a series of data relating to other investigated parameters are attached. First of all, it refers to the hematological status. Namely, a low hemoglobin level indicates that the iron synthesis mechanism in the fish is damaged. This is thought to be due to the anemia present in the fish. The registered low hemoglobin values are caused by the presence of hemolysis and limited aerobic glycolysis, which stops hemoglobin synthesis.

Changes in dehydration, diet, erythrocyte synthesis, and membrane permeability cause changes in hematocrit levels. Stress in fish causes low blood pH values, increase in erythrocyte volume and a subsequent increase in hematocrit percentage (Saravanan et al., 2011). In this study, the hematocrit values obtained were higher than in the control group. (Alak et al., 2018)

From the obtained results of the conducted study and the consulted literature, the positive influence of zeolite on several parameters responsible for the growth of the examined individuals in aquaculture is evident.

CONCLUSION

The study demonstrates that the addition of 1% zeolite to commercial fish feed significantly enhances the growth of rainbow trout compared to feeding with commercial feed alone. Group A, with the zeolite supplement, achieved the highest total growth of 43.43 kg, surpassing Group B (27.1 kg) and Group C (25.3 kg). This result highlights the efficacy of zeolite as a growth-enhancing additive in aquaculture.

The condition factor analysis further supports these findings, with values in Group A showing a decreasing trend from 1.34 at the first measurement to 0.91 at the last, consistent with increasing fish mass and length. Groups B and C exhibited similar declining trends but with less significant initial and final values, emphasizing the superior growth dynamics observed in the zeolite-supplemented group.

These findings underscore the potential of zeolite as a practical and cost-effective feed additive to improve growth performance in aquaculture. Further research is encouraged to explore the long-term effects of zeolite on fish health, water quality, and its applicability across other species and aquaculture systems.

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Section B

MODERN ASPECTS OF QUASICONTINUOUS FUNCTIONS

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Abstract

The concept of continuity became an inspiration for the creation of topology. In the 20th century, there were many attempts to generalize this concept. One such attempt was made by the Polish mathematician Stefan Kempisty in the 1920s, when he introduced the concept of quasicontinuity. Various concepts of continuity in topological spaces are defined and their interconnections are examined. In this paper, we consider only Kempisty's quasicontinuity for functions of several real variables, in order to give a new approach to these functions regarding various applications in many fields of technical sciences. New proofs are provided for three of his fundamental theorems from his original work. A new generalization of Kempisty's theorem is made with three new theorems, each of which is individually stronger than Kempisty's theorem and which address the issues posed by his theorem. Two of these theorems, in general form, were proved by J. Ewert, who obtained them while examining multiplied functions, but the proofs given in this paper do not utilize the mentioned results of J. Ewert.

Keywords: quasicontinuous function, symmetrically quasicontinuous function, upper quasicontinuous function, lower quasicontinuous function, equally quasicontinuous functions.

INTRODUCTION

The concept of continuity has played a significant role in the development of mathematical analysis, but also beyond it. In fact, it can be said that thisconcept became an inspiration for the creation of topology.

In the 20th century, there were many attempts to generalize this concept. One such attempt was by the Polish mathematician Stefan Kempisty in the 1920s, who introduced the concept of quasicontinuity. In (Seweryn-kuzmanovska and Chalamani 2014), various contcepts of continuity in topological spases are defined and their relationships are ehamined.

The purpose of this paper is to give a new insight of Kempisty's quasicontinuity in light of modern topological terminology. We use his original work (Kempisty 1932), but we have replaced many of his proofs with our own. This applies to the proofs of Theorems 2.1, 4.1, and 4.2. Additionally, one of theorems shown by Kempisty in (Kempisty 1932) has been replaced with three Theorems: 5.1, 5.2, and 5.3. Each of these theorems is individually stronger than Kempisty's theorem and addresses the issues posed by his theorem. As we know, two of these Theorems, namely 5.2 and 5.3, were proved in a general form in the works (Ewert 1982) and (Ewert 1984) by J. Ewert, obtained while Ewert was examining multifunctions. However, the proofs provided in this paper do not utilize the aforementioned results of J. Ewert.

QUASICONTINUOUS FUNCTIONS

Let $\mathbb{R}$ be a set of real numbersand let $\mathbb{R}^n$ is n-dimensional Cartesian space.

Definition 2.1. In space $\mathbb{R}^n$, the set of form:

$$P=(a_1,b_1)\times(a_2,b_2)\times\ldots\times(a_n,b_n)=\prod_{i=1}^{n}(a_i,b_i)$$

is called *open n-dimensional interval.*

All intervals considered here will be non-degenerate, i.e. $a_i<b_i$ for $i=1,2,\ldots,n.$

Definition 2.2. A neighborhood V_x of the point $x=(x_1,x_2,\ldots,x_n)$ is any interval of form $(x_1-r,x_1+r)\times(x_2-r,x_2+r)\times\ldots(x_n-r,x_n+r).$

Let $f:\mathbb{R}^n\to\mathbb{R}$ be an arbitrary function. The notion of quasicontinuity, introduced earlier in (Seweryn-Kuzmanovska and Chalamani 2014) (Definition 2.1), here we define as follows:

Definition 2.3. A function $f:\mathbb{R}^n\to\mathbb{R}$ is called *quasicontinuous* at the point $x^0=(x_1^0,x_2^0,\ldots,x_n^0)$, if for an arbitrary $\varepsilon>0$, there exists an interval in every neighborhood of that point, in which the inequality

$$\left|f(x)-f(x^0)\right|<\varepsilon$$

A function $f:\mathbb{R}\to\mathbb{R}$ continuous from one side at some point, isquasicontinuous in that point.

A function $f:\mathbb{R}^2\to\mathbb{R}$ continuous at a point in the direction of some angle (with vertex located at the same point), is also quasicontinuous.

A function $f:\mathbb{R}^n\to\mathbb{R}$ that is quasicontinuous everywhere is obviously pointwise discontinuous, but there are pointwise discontinuous functions that are not quasicontinuous. An example of such a function is the characteristic function of a finite set of points.

Note 2.1. If in every interval there is a point of quasicontinuity, then the function $f:\mathbb{R}^n\to\mathbb{R}$ is also pointwise discontinuous.

Proof. Let $U \subset \mathbb{R}^n$ be a non-empty open set. We will show that within the set U there exists a point of continuity of the function f.

Let P_1 be a closed interval that is contained in U. According to the assumption, there exists the point $x_1 \in Int\, P_1$ which is a point of quasicontinuity of a function f. Then, there exists a closed interval $P_2 \subset Int\, P_1$ such that for each point $x \in P_2$ the inequality holds:

$$\left| f(x) - f(x_1) \right| < 1.$$

Let $x_2 \in Int\, P_2$ be the accumulation point of the function f. Then there exists a closed interval $P_3 \subset Int\, P_2$ such that for each point $x \in P_3$ the condition is satisfied

$$\left| f(x) - f(x_1) \right| < \frac{1}{2}.$$

Proceeding in the same way, in the k-th step of mathematical induction we find a point $x_k \in Int\, P_k$ and a closed interval $P_{k+1} \subset Int\, P_k$ such that for each point $x \in P_{k+1}$ holds:

$$\left| f(x) - f(x_1) \right| < \frac{1}{k}.$$

Without losing generality, it can be assumed that $d(P_k) < \frac{1}{k}$.

Let x_0 be a common point for all intervals P_k $(k = 1,2,\ldots)$. It is easy to see that the function f is continuous at the point x_0. ♦

We will prove the following

Theorem 2.1. If a function $f : \mathbb{R}^n \to \mathbb{R}$ is quasicontinuous with respect to every variable, then f it is quasicontinuous.

Proof. First, let suppose that $n = 2$. We consider the function $f : \mathbb{R}^2 \to \mathbb{R}$. Let $(x_0, y_0) \in \mathbb{R}^2$ is a fixed point and $\varepsilon > 0$. Let $V_{(x_0,y_0)} = I \times J$ is a neighborhood of the point (x_0, y_0) where I, J are open intervals. Since the function f is quasicontinuous with respect to x, there is an open interval $I_1 \subset I$ such that

$$\left| f(x, y_0) - f(x_0, y_0) \right| < \frac{\varepsilon}{2}, \text{for } x \in I_1.$$

Since all functions $f_x(t) = f(x,t)$ are quasicontinuous, then for each $x \in I_1$ there exists an open interval $J(x) \subset J$ with endpoints rational numbers such that

$$\left| f(x, y_0) - f(x, y) \right| < \frac{\varepsilon}{2}, \text{for } y \in J(x).$$

The set of open intervals with rational endpoints is countable. Then there is an interval $J_1 \subset J$ such that the set $\left\{ x \in I_1 \middle| J(x) = J_1 \right\}$ is of the second category. Hence, there is an open interval $I_2 \subset I_1$ such that the set $A = \left\{ x \in I_2 \middle| J(x) = J_1 \right\}$ is dense in I_2. Let $U = I_2 \times J_1$ and $(x_1, y_1) \in U$. Then,

$$\left| f(x_1, y_1) - f(x_0, y_0) \right| < \varepsilon.$$

Hence,it follows the quasicontinuity of the function f at the point (x_0, y_0). Indeed, otherwise we would have

$$\left| f(x_1, y_1) - f(x_0, y_0) \right| \geq \varepsilon \quad (1)$$

and according to the quasicontinuity of the function $f^{y_1}(t) = f(t, y_1)$ in point x_1 would exsist an open interval $I_3 \subset I_2$, such that

$$\left|f(x,y_1)-f(x_1,y_1)\right|\geq\frac{\varepsilon}{2}\ \text{for}x\in I_3.$$

However, from the density of the set A in I_2 it follows that there is a point $x_3\in A\cap I_3$ and therefore

$$\left|f(x_3,y_1)-f(x_0,y_0)\right|\leq\left|f(x_3,y_1)-f(x_3,y_0)\right|+\left|f(x_3,y_0)-f(x_0,y_0)\right|<\frac{\varepsilon}{2}+\frac{\varepsilon}{2}=\varepsilon,$$

which is the opposite of (1).

For a function $f:\mathbb{R}^n\to\mathbb{R}$, that is quasicontinuous with respect to each of the variables $x_1,x_2,\ldots,x_n,$, we can apply the above procedure for the variables x_1 and x_2, then for the point (x_1,x_2) and the variable, x_3, and finally we can complete the proof by applying this procedure to the point $(x_1,x_2,\ldots,x_{n-1})$ and the variables x_n.

Since every quasicontinuous function is point discontinuous, it follows that a function that is quasicontinuous with respect to each of the variables is point discontinuous.♦

Corollary 2.1. Theorem shown by (Hahn 1921). A quasicontinuous function with respect to each of the variables is point discontinuous.

SYMMETRIC QUASICONTINUOUS FUNCTIONS

We say that n-dimensional open interval

$$P=(a_1,b_1)\times(a_2,b_2)\times\ldots\times(a_n,b_n)$$

is intersected by the hyperplane $x_i=c\ (i=1,2,\ldots,n)$ if $a_i<c<b_i$.

Definition 3.1. A function $f:\mathbb{R}^n\to\mathbb{R}$ is said to be *symmetrically quasincontinuous* with respect to $x_i\ (i=1,2,\ldots,n)$ at a point $x^0=(x_1^0,x_2^0,\ldots,x_n^0)$ if in every open neighborhood of that point there is an interval intersected by a hyperplane $x_i=x_i^0$ in which

$$\left|f(x)-f(x^0)\right|<\varepsilon.$$

It is obvious that the function $f:\mathbb{R}^n\to\mathbb{R}$ is symmetrically quasicontinuous with respect to x_n and is quasicontinuous with respect to $(x_1,x_2,\ldots,x_n)$.

A set that is defined by the conditions:

$$a_i<x_i<b_i\quad\text{за}\ i=1,2,\ldots,n-1,$$
$$x_n=c$$

is an interval on a hyperplane $x_n=c$.

If $f:\mathbb{R}^n\to\mathbb{R}$ is symmetrically quasicontinuous with respect to x_n, then each interval of the hyperplane $x_n=c$ contains the point of symmetric quasicontinuity with respect to x_n, i.e. each interval of this hyperplane contains the point of continuity of this function. Thus, the function $f:\mathbb{R}^2\to\mathbb{R}$ which is symmetrically quasicontinuous with respect to y has the following properties:

$i)$ is quasicontinuous with respect to x,

$ii)$ Any interval parallel to the x-axis contains a point of continuity of the function f.

None of these properties in particular is sufficient for the function to be symmetrically quasincontinuous with respect to y. Hence here are the following examples:

Example 3.1. Let

$$f(x,y)=\begin{cases}1, & \text{if } y \text{ is a rational number}\\ 0, & \text{if } y \text{ is an irational number}\end{cases}.$$

A function $f:\mathbb{R}^2\to\mathbb{R}$ that is defined in this way satisfies the property $i)$, but it is not quasicontinuous at any point (x,y), and therefore itis not symmetrically quasicontinuous at any point.

Example 3.2. We consider a function $f:\mathbb{R}^2\to\mathbb{R}$ which is defined as follows:

$$f(x,y)=\begin{cases}0, & \text{if } x \text{ isirrational}\\ \dfrac{1}{q}, & \text{if } x=\dfrac{p}{q},\ p,q \text{ mutualy prime numbers}\end{cases}.$$

The function f is continuous at any point (x,y), where x is a rational number. It also satisfies the property $ii)$, but it is not symmetrically quasincontinuous with respect to y at the point (x,y), where x is a rational number.

Note 3.1. Any function $f:\mathbb{R}^2\to\mathbb{R}$ that satisfiesboth of the properties $i)$ and $ii)$ is symmetrically quasicontinuous with respect to y.

Proof. Let $\varepsilon>0$ and $(x,y)\in\mathbb{R}^2$. Since the function f is quasicontinuous with respect to x, there is an interval $(a,b)\subset(x-\varepsilon,x+\varepsilon)$ such that for any $u\in(a,b)$ the following inequality holds

$$|f(u,y)-f(x,y)|<\frac{\varepsilon}{2}.$$

In the interval $(a,b)\times\{y\}$ there is a point of continuity of the function f.

The function f satisfies the property $ii)$ which means that there is a $c\in(a,b)$ such that the function f is continuous at the point (c,y). Hence, there exists a nonempty neighborhood U of the point (c,y), such that for each point $(u,v)\in U$ we have

$$|f(u,v)-f(c,y)|<\frac{\varepsilon}{2}.$$

Using the previous inequalities, we obtain:

$$|f(u,v)-f(x,y)|\le|f(u,v)-f(c,y)|+|f(c,y)-f(x,y)|<\frac{\varepsilon}{2}+\frac{\varepsilon}{2}=\varepsilon.\ \blacklozenge$$

Since every continuous function is alsoquasicontinuous, we get a generalization of Note shown by V. Volterra (Volterra 1881), which means that every function $f:\mathbb{R}^2\to\mathbb{R}$, that is continuous with respect to x and that has points of continuity in every interval parallel to x-axis, has a property that we here call quasicontinuity.

We will prove the following theorem:

Theorem 3.1. Any function $f:\mathbb{R}^2\to\mathbb{R}$ that is continuous with respect to x and y is symmetrically quasicontinuous with respect to an arbitrary of the variables.

Proof. Let $\varepsilon>0,\ \delta>0$ and let $(x^0-\delta,x^0+\delta)\times(y^0-\delta,y^0+\delta)$ is a neighborhood of the point (x^0,y^0).

Since the function f is continuous with respect to the variable x, then we can determine the positive number $\alpha<\delta$ that depends on ε and such that for $|x-x^0|<\alpha$ we have

$$|f(x,y^0)-f(x^0,y^0)|<\frac{\varepsilon}{2}.(3.1)$$

Wedenote the set F_p of numbers x of the closed interval $\left[x^0-\alpha, x^0+\alpha\right]$ for which the inequality $\left|y-y^0\right| \le \frac{\delta}{p}$ entails

$$\left|f(x,y)-f\left(x,y^0\right)\right| \le \frac{\varepsilon}{2}. \quad (3.2)$$

Since the function f is continuous with respect to x, then the set F_p is closed.

However, the function under consideration is also continuous with respect to y, and therefore every point of the closed interval $\left[x^0-\alpha, x^0+\alpha\right]$ belongs to one of the sets F_p. At least one of those sets, for example, F_{p_0}, is not nowhere dense and as closed must contain the interval (a,b). Let S be a rectangle $(a,b)\times\left(y^0-\frac{\delta}{p_0}, y^0+\frac{\delta}{p_0}\right)$. It is contained in the given neighborhood and even more it is symmetric with respect to the lines $y=y^0$.

Since for each point of the rectangle the inequalities (3.1) and (3.2) are satisfied, then

$$\left|f(x,y)-f\left(x^0,y^0\right)\right| \le \left|f(x,y)-f\left(x,y^0\right)\right| + \left|f\left(x,y^0\right)-f\left(x^0,y^0\right)\right| < \frac{\varepsilon}{2}+\frac{\varepsilon}{2}=\varepsilon.$$

Hence, the function f is continuous with respect to (x,y) and symmetric with respect to y in the point $\left(x^0,y^0\right)$. ♦

The following theorem, which is more general than the preceding one, will be proved by contradiction.

Theorem 3.2. If a function $f:\square^2\to\square$ that isquasicontinuous with respect to x is continuous with respect to y, then f it is quasicontinuous with respect to (x,y) and symmetric with respect to y.

Proof. It is sufficient to modify the proof of Theorem 2.1. ♦

Example 3.3. Let

$$f(x,y)=\begin{cases}1 & \text{for } x\ge 0 \text{ and } y\ge 0\\ 0 & \text{for the other points}\end{cases}.$$

The function f is quasicontinuous with respect to each of the variables, but it is not symmetrically quasicontinuous with respect y at the points $(x,0)$ for $x\ge 0$.

Therefore, in the Theorem 3.2 we cannot substitute continuity with respect to y with quasicontinuity.

Using the above theorem successively for variables and systems of variables, we conclude that a function $f:\square^n\to\square$ continuous with respect to each of the variables $x_1,x_2,\ldots,x_n$ is quasicontinuous with respect to $(x_1,x_2,\ldots,x_n)$ and symmetric with respect to x_i $(i=1,2,\ldots,n)$.

Since every function that is symmetrically quasicontinuous with respect to x_i $(i=1,2,\ldots,n)$ has points of continuity in every interval of the hyperplane $x_i=c$, then the continuous function with respect to each of the variables, is point discontinuous, since there are points of continuity in every interval of the hyperplane $x_i=c$.

This is a well-known conclusion as a final Note shown by M. Hahn (Hahn 1921).

QUASICONTINUOUS FUNCTION FROM UPPER AND LOWER

Definition 4.1. A function $f:\mathbb{R}^n \to \mathbb{R}$ is called *upper (lower)quasicontinuous*at a point $x^0 = \left(x_1^0, x_2^0, \ldots, x_n^0\right)$ if for an arbitrarily $\varepsilon > 0$, in any neighborhood at that point there is an interval in which

$$f(x) < f\left(x^0\right) + \varepsilon \ \left(f(x) > f\left(x^0\right) - \varepsilon\right).$$

A function $f:\mathbb{R} \to \mathbb{R}$ that is upper (lower) semicontinuous on one side, is also upper (lower) quasicontinuous.

Specifically, a monotonic function is everywhere upper and lower quasicontinuous. If the function has onesided limits at a certain point, then it is upper and lower quasicontinuous at that point.

From the definitions mentioned above, it follows that a quasicontinuous function must also be upper and lower quasicontinuous, but the converse theorem does not hold. For example, the function $f:\mathbb{R} \to \mathbb{R}$ such that

$$\lim_{x_1 \to x_1^{0-}} f(x_1) < f\left(x_1^0\right) < \lim_{x_1 \to x_1^{0+}} f(x_1)$$

is not quasicontinuousat the pointx_1^0.

Theorem 4.1. If a function $f:\mathbb{R}^n \to \mathbb{R}$ is everywhere upper quasicontinuous or everywhere lower quasiontinuous, then f is pointwise discontinuous.

Proof. Without losing generality, we can assume that a function f is bounded and everywhere upper quasicontinuous. Otherwise, we can consider a function $\arctan f$ that has the same set of points of continuity as the function f.

Let $V \subset \mathbb{R}^n$ be a non-empty open set. Let us show that in the set V there is a point of continuity of the function f. Let $m_1 = \inf_{x \in V} f(x)$. There is a point $x_1 \in V$ such as

$$f(x_1) - m_1 < 1.$$

Since the function f is upper quasicontinuous at the point x_1, then there is a closed interval $P_1 \subset V$ such that for each point $x \in P_1$,

$$f(x) - f(x_1) < 1.$$

and we have $d(P_1) < 1$.

Let $m_2 = \inf_{x \in Int P_1} f(x)$. There is a point $x_2 \in Int\, P_1$ such as

$$f(x_2) - m_2 < \frac{1}{2}$$

and there is a closed interval $P_2 \subset Int\, P_1$ such that for each point $x \in P_2$,

$$f(x) - f(x_2) < \frac{1}{2} \quad \text{and} \quad d(P_2) < \frac{1}{2}.$$

In general, in k -th step we find the point $x_k \in Int\, P_{k-1}$ such that

$$f(x_k) - m_k < \frac{1}{k},$$

where $m_k = \inf_{x \in Int P_{k-1}} f(x)$ and there is a closed interval $P_k \subset Int\, P_{k-1}$ such that $d(P_k) < \frac{1}{k}$ and for each point $x \in P_k$,

$$f(x) - f(x_k) < \frac{1}{k}.$$

Let x_0 is a common point of the intervals $P_k\ (k=1,2,\ldots)$. It is obvious that $x_0 \in V$ and the function f is continuous at the point x_0. Indeed, for any $\varepsilon > 0$, there is a number k such that $\frac{3}{k} < \varepsilon$. Then $x_0 \in Int\, P_k$ and

$$f(x_0) \geq m_k = \inf_{x \in IntP_{k-1}} f(x).$$

For each point $x \in P_k$,

$$f(x) - f(x_k) < \frac{1}{k} \quad \text{and} \quad f(x_k) < m_k + \frac{1}{k}.$$

As a result, for each point $x \in P_k$ the following inequality is applied:

$$|f(x) - f(x_0)| \leq |f(x) - f(x_k)| + |f(x_k) - f(x_0)| <$$

$$< |f(x) - f(x_k)| + |f(x_k) - m_k| < \frac{1}{k} + \frac{2}{k} = \frac{3}{k} < \varepsilon., \blacklozenge$$

Theorem 4.2. If a function $f: \mathbb{R}^n \to \mathbb{R}$ is pointwise discontinuous, then f is upper or lower quasicontinuousat each point.

Proof. We fix the point $x \in R^n$. Let U_k be a descending sequence of neighborhood of the point x for which:

$$\bigcap_{k=1}^{\infty} U_k = \{x\}.$$

Since the function f is pointwise discontinuous, then inside each neighborhood U_k there is a point x_k which is the point of continuity of the function f. As a result, for each $k = 1,2,\ldots$ exists a neighborhood V_k of the point x_k, such that the $x \in V_k$ inequality holds for each

$$|f(x) - f(x_k)| < \frac{1}{2k}.$$

Without losing generality, let assume that there exists $\lim_{k\to\infty} f(x_k)$ (finite or infinite).

Otherwise, we will restrict it to some subsequence.

There are the following options:

$$f(x) \geq \lim_{k\to\infty} f(x_k) \quad \text{or} \quad f(x) < \lim_{k\to\infty} f(x_k).$$

In the first case, the function f is upper quasicontinuous at the point x, and in the second case it is lower quasicontinuous at the point x. $\blacklozenge$

Repeating the procedure from the proof of Theorem 2.1 we can prove the following theorem:

Theorem 4.3. If the function $f: \mathbb{R}^2 \to \mathbb{R}$ is quasicontinuous with respect to x and upper quasicontinuous with respect to y, then f is upper quasicontinuous with respect to the point (x, y).

Using the fact that a pointwise discontinuous function is upper or lower quasicontinuousat each point, and slightly varying the proof of Theorem 2.1, we obtain:

Theorem 4.4. If a function $f: \mathbb{R}^2 \to \mathbb{R}$ is pointwise discontinuous with respect to x andquasicontinuous with respect to y, then f is quasicontinuous at the point (x, y) at each point of continuity with respect to x.

Corollary 4.1. For a function of two variables to be pointwise discontinuous in a plane, it is sufficient to assume that it is quasicontinuous with respect to one of the variables and pointwise discontinuous with respect to the other.

Using the Theorem 4.4 for x_1 and $(x_2, x_3, \ldots, x_n)$ and using Theorem 2.1, we note that a function $f : \square^n \to \square$ of n variables $x_1, x_2, \ldots, x_n$ that is pointwise discontinuous with respect to x_1 and quasicontinuous with respect to each of the other variables, is pointwise discontinuous.

EQUALLY QUASICONTINUOUS FUNCTIONS

Definition 5.1. A function $f_s : \square^n \to \square$ that belongs to the family $\{f_s\}_{s \in S}$ (S is an index set) are called *equally quasicontinuous*, if for arbitrary $\varepsilon > 0$ and for an arbitrary neighborhood of the point x^0, there is an interval that is contained in that neighborhood and in which the inequalities are fulfilled:

$$\left| f_s(x) - f_s(x^0) \right| < \varepsilon \quad \text{за } s \in S.$$

Therefore, a continuous function and a quasicontinuous function are equally quasicontinuous. It is obvious that the sum of two equally quasicontinuous functions is quasicontinuous.

When the same concept proof of Theorem 2.1 is repeated, it is obvious that:

Note 5.1. If a function $f : \square^2 \to \square$ и $g : \square^2 \to \square$ are equally quasicontinuous with respect to x and discontinuouswith respect to y, then f and g are equally quasicontinuous with respect to the point (x, y).

When a substitution is made in Note 5.1: x to x_1 and y to x_2, than x to the point (x_1, x_2) and y to x_3, and finally x tothe point $(x_1, x_2, \ldots, x_{n-1})$ and y to x_n, we have the following

Corollary 5.1. If functions $f : \square^n \to \square$ and $g : \square^n \to \square$ are continuous with respect to each of the variables, then f and g are equally quasicontinuous with respect to the point

$$(x_1, x_2, \ldots, x_n).$$

Theorem 5.1. If functions $f_k : \square^n \to \square$ $(k = 1, 2, \ldots)$ are equally quasicontinuous and $\lim\limits_{k \to \infty} f_k = f$, than the function f is quasicontinuous.

Proof. We fixa point $x \in R^n$ and a number $\varepsilon > 0$. Let U be a neighborhood of the point x.

Since the functions f_k are equally quasicontinuous at the point x, then there is an open interval $V \subset U$ such that for each number k and each point $t \in U$ the inequality holds

$$\left| f_k(t) - f_k(x) \right| < \frac{\varepsilon}{2}.$$

Also, for every k we have

$$\left| f_k(x) - f(x) \right| < \frac{\varepsilon}{2}.$$

As a result, for each number k and each point $t \in U$ stands:

$$\left| f(t) - f(x) \right| \le \left| f(t) - f_k(t) \right| + \left| f_k(t) - f_k(x) \right| + \left| f_k(x) - f(x) \right| <$$

$$< \left| f(t) - f_k(t) \right| + \frac{\varepsilon}{2} + \left| f_k(x) - f(x) \right|.$$

Letting $k \to \infty$ we have

$$\left|f(t)-f(x)\right|<\frac{\varepsilon}{2}<\varepsilon.\ \blacklozenge$$

Theorem 5.2. If functions $f_k:\mathbb{R}^n\to\mathbb{R}$ $(k=1,2,\ldots)$ are equally quasicontinuous and $\lim\limits_{k\to\infty}f_k=f$, then the function f pointwise discontinuous.

Proof. It suffices to show that for any nonempty open set V and each number $\varepsilon>0$, there is an open interval $U\subset V$ such that for each x and y that belong to U the inequality holds

$$\left|f(x)-f(y)\right|<\varepsilon.$$

Let V be an open setand let $\varepsilon>0$. Since $\lim\limits_{k\to\infty}f_k=f$, for each point $x\in V$ there is a natural number $k(x)$ such that for each $k\ge k(x)$ hold

$$\left|f_k(x)-f(x)\right|<\frac{\varepsilon}{6}.$$

Since $V=\bigcup\limits_{k=1}^{\infty}V_k$, where $V_k=\left\{x\in V\,\middle|\,k(x)=k\right\}$, then at least one of the sets V_k is nowhere dense. Lets chose this set to be V_{k_0}. Then, there are an open interval $U\subset V$ where the set V_{k_0} is dense in U. Hence, for each point $x\in U\cap V_{k_0}$ the inequality holds

$$\left|f_{k_0}(x)-f(x)\right|<\frac{\varepsilon}{6}.$$

Let $x\in IntU$. Because the function f_{k_0} is quasicontinuous in the point x, there is an open interval $Z\subset IntU$ such that for each $t\in Z$

$$\left|f_{k_0}(t)-f_{k_0}(x)\right|<\frac{\varepsilon}{6}.$$

Then, for each $u,v\in Z$:

$$\left|f_{k_0}(u)-f_{k_0}(v)\right|\le\left|f_{k_0}(u)-f_{k_0}(x)\right|+\left|f_{k_0}(x)-f_{k_0}(v)\right|<\frac{\varepsilon}{6}+\frac{\varepsilon}{6}=\frac{\varepsilon}{3}.$$

Let $m\ge k_0$. Then

$$\left|f_m(u)-f_m(v)\right|\le\varepsilon.$$

Really,if $u,v\in V_{k_0}$ them

$$\begin{aligned}\left|f_m(u)-f_m(v)\right|\le{}&\left|f_m(u)-f(u)\right|+\left|f(u)-f_{k_0}(u)\right|+\left|f_{k_0}(u)-f_{k_0}(v)\right|+\\&+\left|f_{k_0}(v)-f(v)\right|+\left|f(v)-f_m(v)\right|<\frac{\varepsilon}{6}+\frac{\varepsilon}{6}+\frac{\varepsilon}{3}+\frac{\varepsilon}{6}+\frac{\varepsilon}{6}=\varepsilon.\end{aligned}$$

If $u,v\notin V_{k_0}$, then, since the set V_{k_0} is dense in U and the function f_m is quasicontinuous (a quasicontinuous function is nearly continuous), there are sequences $\{u_k\},\{v_k\}$ of both elements of the set $V_{k_0}\cap Z$ convergent respectively to u and v, and such that

$$f(u_k)\to f(u)\text{ and }f(v_k)\to f(v).$$

As a result, for $k=1,2,\ldots$ we have

$$\left|f_m(u_k)-f_m(v_k)\right|<\varepsilon,$$

i.e. we have:

$$\lim_{k\to\infty}\left|f_m(u_k)-f_m(v_k)\right|=\left|f_m(u)-f_m(v)\right|<\varepsilon.$$

The proof will be completed if we put $m\to\infty$ in the above inequality ♦

Theorem 5.3. If the functions $f_k:\mathbb{R}^n\to\mathbb{R}$ $(k=1,2,\ldots)$ are quasicontinuous and the sequence $\{f_k\}$ is uniformly convergent to the function f, then f is a quasicontinuous function.

Proof. We fix the point $x\in\mathbb{R}^n$, number $\varepsilon>0$ and the open neighborhood U of the point x.

From the uniform convergence of the sequence $\{f_k\}$ it follows that there is an index m such that

$$\left|f_m(x)-f(x)\right|<\frac{\varepsilon}{3}\ \text{for each}\ x\in\mathbb{R}^n.$$

Since the function f_m is quasicontinuous at a point x, there exists a nonempty open set $V\subset U$ such that

$$\left|f_m(u)-f_m(x)\right|<\frac{\varepsilon}{3}\ \text{for each}\ u\in V.$$

Therefore, for $u\in V$

$$\left|f(u)-f(x)\right|\le\left|f(u)-f_m(u)\right|+\left|f_m(u)-f_m(x)\right|+\left|f_m(x)-f(x)\right|<\frac{\varepsilon}{3}+\frac{\varepsilon}{3}+\frac{\varepsilon}{3}=\varepsilon,$$

i.e. the function f is quasicontinuous at a point x. ♦

Note 5.2. A composition of quasicontinuous functions does not have to be a quasicontinuous function.

Example 5.1. Consider the functions $f:\mathbb{R}\to\mathbb{R}$ and $g:\mathbb{R}\to\mathbb{R}$ defined by:

$$f(x)=\begin{cases}0 & \text{if } x=0\\ x & \text{if } x\in\mathbb{R}^+\\ -x & \text{if } x\in I^+\\ -x+1 & \text{if } x\in\mathbb{R}^-\\ x-1 & \text{if } x\in I^-\end{cases}\quad\text{and}\quad g(x)=\begin{cases}0 & \text{if } x=0\\ x+1 & \text{if } x\in\mathbb{R}^+\\ -x-1 & \text{if } x\in I^+\\ -x & \text{if } x\in\mathbb{R}^-\\ x & \text{if } x\in I^-\end{cases}.$$

Note that composition $g\circ f$ is defined by:

$$(g\circ f)(x)=\begin{cases}0 & \text{if } x=0\\ x+1 & \text{if } x\in\mathbb{R}^+\\ -x & \text{if } x\in I^+\\ -x+2 & \text{if } x\in\mathbb{R}^-\\ x-1 & \text{if } x\in I^-\end{cases}.$$

The function f is quasicontinuous at the point $x_0=0$, the function g is continuous at the point $f(x_0)$ and the composition $g\circ f$ is not quasicontinuous at any point.

Theorem 5.4. If the function $f:\mathbb{R}\to\mathbb{R}$ is quasicontinuous and the function $g:\mathbb{R}\to\mathbb{R}$ is continuous, then the composition $g\circ f$ is a quasicontinuous function.

Proof. Let $x_0\in\mathbb{R}$, $y_0=f(x_0)$ and $z=g(y_0)$. We can show that the composition $g\circ f$ is quascontinuous at the point x_0.

Let V be the open neighborhood of the point z_0 and let U be the open neighborhood of the point x_0. Since the function g is continuous, then $g^{-1}(V)=W$ it is the open neighborhood of the point y_0. Since the function f is quasicontinuous at a point x_0, then there exists a non-empty open set $Z \subset U$ such that $f(Z) \subset W$. Therefore, $g(f(Z)) \subset V$. ♦

Note 5.3. There is a quasicontinuous function $f:\square \to \square$ and a continuous function $g:\square \to \square$ such that composition $f \circ g$ is not a quasicontinuous function at every point.

Example 5.2. Consider

$$f(x)=\begin{cases}1 & \text{if } x>0\\ x & \text{if } x\le 0\end{cases} \quad \text{and} \quad g(x)=x^2$$

for $x \in \square$.

Then

$$(f \circ g)(x)=\begin{cases}0 & \text{if } x=0\\ 1 & \text{if } x\neq 0\end{cases}$$

is not a quascontinuous function at the point $x=0$.

Note 5.4. If $f:\square \to \square$ is a continuous function, and $g:\square \to \square$ is a homomorphism, then $f \circ g$ is a quasicontinuous function.

The proof is obvious.

CONCLUSION

The main goal of the presented paper, was to examine the basics of Kempisty theorems and to give a new and modern approach in proving these theorems. This purpose was established with hope that this approach will give easier way to use the underlying mathematical models in various applications. Models including quasicontinuity of many variables are widely used in many technical fields, such as Control systems (Estrada and Fridman 2008), (Polyakov and Chairez 2014) Thermodynamical systems and heat transfer (Kane and Northrop 2023), (Kick, Jantos and Junker 2022) as subjects of our scientific research. Furthermore,quasicontinuous functions have several applications in other technical fields such as: optimization problems, computational modelling, stress and strain analysis, vibrations etc.

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